

DECEMBER 10, 1914

10¢ A COPY

MOTOR AGE



This is the largest of our eight electric models. Capacity 6 tons. Chassis price without battery.

\$2500

This is the smallest of our eight gasoline models. Capacity 1500 pounds. Chassis price,

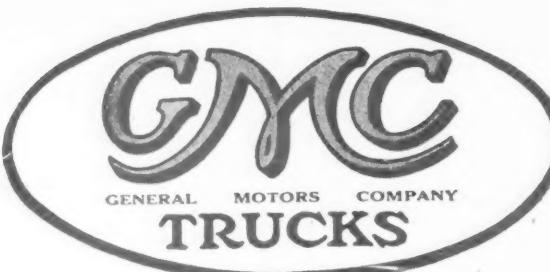
\$1090



YOUR haulage or delivery problem has features all its own. You are anxious to solve this problem of yours in the most satisfactory way. While the final decision rests with you, aren't you anxious to take what advantage you can of the information and experience of the largest company in the world building both gasoline and electric trucks? If you are write us at once.

In some businesses electric trucks have decided advantages. In others gasoline trucks only can give the required service. In still others, either gasoline or electric trucks can be used with profit. But there is a certain size truck, electric or gasoline, that is the **most profitable truck for you**.

General Motors Truck Company builds both gasoline and electric trucks in the most complete range of sizes yet produced. We have no prejudice in favor of any particular truck. Our one endeavor is to help you choose the truck that will serve you best. We can profit only by recommending the most profitable truck for you.



Gasoline

Electric

and sell them at prices that are lower than other high grade trucks.

Our service plan actually co-operates with you to secure the results you desire in your delivery or haulage service. A letter from you outlining the nature of the work you have to do and the character of the roads in your locality, will assist us in giving you information of value. It would be wise to communicate with the nearest GMC dealer also.

Dealers: For the same reason that GMC Trucks are most profitable for business men to buy they are also the most profitable for the dealer to sell—Let us tell you why.

GENERAL MOTORS TRUCK COMPANY

Direct Factory Branches:
Philadelphia, St. Louis, Kansas City

One of the Units of General Motors Company
PONTIAC

MICHIGAN

Direct Factory Branches:
New York, Detroit, Boston, Chicago

The Product of Brake Specialists



TRADE MARK
Raybestos
REG. U.S. PAT. OFF.

The knowledge we get from books is theory, but the knowledge we get from doing things ourselves is experience.

A specialist is one, who with both theory and experience as a foundation, applies his energies to the development of some one thing.

RAYBESTOS is the product of brake specialists.

Our experience as manufacturers of automobile brakes and brake mechanisms began as far back as 1901.

In 1905, when automobile manufacturers were having trouble with brake linings burning out, we conceived and produced the first woven asbestos brake lining and in 1906 trade marked it RAYBESTOS.

From the very first we have had what no other brake lining manufacturer has even now—a world of experience in the development and manufacture of brakes and brake mechanisms.

Time has proven that our selection of asbestos yarn as the ideal fabric from which to manufacture automobile brake linings was sound.

We were the first to introduce and weave wire core asbestos yarn into brake lining.

We were the first to impregnate brake linings with a heat and wear resisting compound to give them long life.

Our experience in the manufacture of brake lining extends over a much longer period of time than that of any other brake lining manufacturer.

Even if other brake linings were made of as good materials as RAYBESTOS our experience as designers and manufacturers of brakes and brake mechanisms and the specialized skill of our workmen are factors which they cannot duplicate.

The unqualified satisfaction of hundreds of thousands of motorists will substantiate every claim for superior service we ever have made.

RAYBESTOS is sold under a definite guarantee of one year's service from the date it goes on a car.

The Royal Equipment Co., 1354 Bostwick Ave., Bridgeport, Conn.

When Writing to Advertisers, Please Mention Motor Age.

Established 1880 Incorporated 1899

Pioneer Workers

30.9% of the workmen on our payroll have been in the employ of our company five years, or longer.

More than 7% of our employees have been satisfied to remain continually connected with us for more than ten years.

All of the following important men have been identified with our organization more than five years:

Sales Manager	Foreman Polishing and Plating Department
Purchasing Agent	Foreman of Experimental Department
Service Manager	Final Inspector
Assistant Sales Manager	Chief Draftsman
Maintenance Supervisor	Auditor
Chassis Assembly Foreman	Assistant Auditor
Foreman Electrician	Assistant Factory Manager
Final Assembly Foreman	Cost Department Manager
Foreman Cabinet Maker	Time Keeper
Foreman Gear Cutting Department	Service Stock Keeper
Foreman Road Testing Department	Superintendent of Assembly Plant
Sheet Metal Foreman	Foreman of Receiving and Shipping Department
Foreman Paint Shop	Assistant Service Manager
Foreman Body Designing Department	Manager Filing and Mailing Department
Body Assembly Foreman	
Machine Shop Foreman	

Features of the Light Car

Price \$1285 f. o. b. Lansing,
Michigan.
Full-rated 30 H. P. four cylinder motor.
Leather of the quality used in most \$3000 cars.
Five Quick Demountable rims, Non-skid tires.
Rear spare tire rack.
Concealed tool boxes in running board aprons.
Aluminum running boards.
Mud scrapers on running boards.
Handy cabinets in dash for toilet articles, goggles, gloves, etc.
Door pockets.
Circassian walnut interior woodwork.
One-man top.
Jiffy curtains.
Eight-day clock.
Focusing device for head lamps.
Head lamp dimmers.
Delco electric self-cranking and illuminating systems.
Stewart-Warner speedometer.
¾ elliptic springs.

Catalog M will be furnished on request. This is a complete catalog, giving mechanical details of the Oldsmobile Light Four at \$1285 and the famous Oldsmobile Six at \$2975.

ADDRESS

Olds Motor Works
Lansing Michigan

The Knowledge Born of Experience

Wise and far seeing policies have enabled us to keep workmen in our employ for long periods of years and with this accumulated knowledge we build and build well.

Long experience has enabled our shops to master the art and technique of motor car building. Vast resources permit us to buy materials economically and to quote a price on our manufactured cars which is a strong incentive to buy.

We are firm in the conviction that there is no other car on the market under \$2500 as beautifully designed, as handsomely finished and as completely equipped as the Oldsmobile Four.

(MADE IN U. S. A.)



MOTOR AGE
Published by the
CLASS JOURNAL COMPANY
910 South Michigan Avenue
CHICAGO ILLINOIS

YEARLY SUBSCRIPTION RATES

United States, Mexico and U. S. Possessions.....	\$8.00
Canada and all Foreign Countries.....	5.00

All currency should be sent by registered mail.

Two weeks should be allowed for change of address to become effective, or for receipt of first copy on a new subscription.

In forwarding change of address, please give old and new address.

BEWARE OF SOLICITORS, OFFERING SUBSCRIPTIONS AT CUT RATES.

Volume XXVI

December 10, 1914

No. 24

C o n t e n t s

MOTOR AGE'S REVIEW OF 1914 ROAD RACING.....	5
Ralph de Palma wins driving championship of America—Mercedes the champion car—Honorable mention for Eddie Pullen and Barney Oldfield—Speedway results	
RALPH DE PALMA, TWICE CROWNED CHAMPION OF THE ROAD..	13
Sketch of the man who helped make racing history	
REPORT SHOWS 672 TRUCKS SHIPPED ABROAD IN OCTOBER... .	15
War brings about shipments worth \$2,286,964	
EDITORIAL—MOTOR AGE'S RACING REVIEW—SOME FOREIGN TRENDS	16
MOTORING NIMRODS HUNT RABBITS WITH SEARCHLIGHTS.....	17
Illinois sportsmen adopt new methods	
CROSS-LICENSING AGREEMENT FAVORED BY CHAMBER.....	18
Interchange of patent privileges recommended	
STEWART VACUUM FEED TESTED BY A. A. A.....	19
Interesting results attained in Indianapolis trials	
CONTEST BOARD SETS 1915 RACING DATES.....	20
Applications of tentative speedways tabled—Records accepted	
SAN DIEGO PLACED ON RACING CALENDAR.....	21
California road race set for January 9	
CONTROL OF PEDESTRIANS CALLED SAFETY-FIRST NECESSITY..	22
F. H. Elliott outlines results of his long trip	
MOTOR CAR DEVELOPMENT.....	26
Description of Reo, Mitchell's new six, Paige's new six, King eight-cylinder, Monroe and Kline	
FORD'S AGENTS' CONTRACT HELD INVALID.....	28
Decision made in Cincinnati case	
INDEX TO ADVERTISEMENTS.....	84
DEPARTMENTS	
See America First.....	17
Readers' Clearing House.....	24
Motor Car Repair Shop.....	37
The Accessory Corner.....	38
From the Four Winds.....	40
Coming Motor Events.....	40
Among Makers and Dealers....	41
Recent Incorporations.....	41
Brief Business Announcements..	42
New Agencies Appointed.....	42

"In the Wake of the Blue and the Gray" will appear in the next issue of Motor Age in the shape of an article which should appeal to tourists, inasmuch as it tells of the motoring attractions of the southland with its old battlefields and its many other points of historic interest. This is a particularly timely article in view of the present European war and another strong argument for "See America First."

Thousands of motorists and dealers—unable to attend the Automobile Shows in person—get their show information direct from the pages of

MotorAge**"The Motoring Authority of America"**

You can drive your message home to the greatest number of potential buyers by supplementing your show exhibit with the use of impressive advertising copy in the Dec. 31st, Jan. 7th, Jan. 21st, and Jan. 28th issues of MOTOR AGE.

If you are not an exhibitor take advantage of this splendid opportunity for gaining a lasting impression on 23,000 possible customers.

Let our Service Department assist you in the preparation of copy.

Make Your Space Reservations Now!

MOTOR AGE
910 S. Michigan Ave., Chicago

TO FORD OWNERS

You can now obtain the Gray & Davis electric starting-lighting system. The greatest convenience ever offered FORD owners. Designed, developed and built by specialists. A time-tested system ranking in material and construction with Gray & Davis equipment found on high-priced cars.

You will want this efficient system for *your* FORD. Write for particulars.

GRAY & DAVIS, Inc., Boston, Mass.



Motor Age's Review of 1914 Road Racing

Ralph de Palma Wins Driving Championship of America—Mercedes the Champion Car—Honorable Mention for Eddie Pullen and Barney Oldfield

By C. G. Sinsabaugh

NO new name is added to the roll of honor this year in the selection of Motor Age's road racing champion for 1914. Ralph de Palma already is enrolled as the best in 1912 and he earns the right again through his most consistent work during the season which closed with Corona. Three firsts in five starts and those other two starts fourths certainly is a record that establishes de Palma's right to the road racing championship of 1914 and Motor Age so decrees.

Mercedes Champion Car

A new name appears, however, in the other championship decided by Motor Age—that of champion car, but the same reasoning that gives dePalma his honors applies here also, and so the choice is the Mercedes which has the same record as dePalma, for the latter is the only one who drove the German car in the American road races of 1914.

These choices are made only after a careful review of the situation, which was more

MOTOR AGE'S CHAMPIONS

Because of the exceptionally fine showing which he made during the season just closed, winning three of the important road races of this country and finishing fourth in two others, Motor Age selects Ralph De Palma as the American road racing champion of 1914. By the same token the Mercedes is picked as champion car.

complex than ever before because of the wonderful showing made by the Mercer and Pullen. Oldfield, too, has been a most consistent performer and a most important factor in all the big events of the season just closed, so Motor Age feels that in giving them "distinguished mention" that it is only just recognition of their many sterling performances. A meed of praise also should be handed out to the Stutz, which Oldfield drove to victory in the Los Angeles-Phoenix desert road race, prob-

ably the most strenuous speed contest of a decade.

Unquestionably only three pilots can be considered for the driving championship—dePalma, Pullen and Oldfield, and when the evidence is sifted to the bottom it leaves dePalma bowing that the laurel wreath may be placed on his brow. DePalma won three of the five big road races of the year, scoring firsts in the Vanderbilt at Santa Monica last February, and in both events at Elgin, the Chicago Automobile Club cup and the Elgin National trophy. His other two starts were the grand prix at Santa Monica and the recent Corona speed duel. In the former he finishes fourth after having once been in the lead. In the latter he also was fourth and both times the winner was Pullen.

Pullen's Fine Showing

On Pullen's side one finds that he has a record of two firsts and a second in his five starts, twice being unable to finish. He and DePalma competed in the same



RALPH DE PALMA, AMERICAN ROAD RACE CHAMPION OF 1914

five races, which makes the comparison easier. Pullen started the season at Santa Monica with a victory in the grand prix, which followed his elimination in the Vanderbilt at a time when it looked as if he would be a winner, a broken wheel, the result of taking Death curve too fast, stopping him when he was far out in the front.

At Elgin Pullen again stacked up with DePalma and the honors went to the Italian, who shattered precedent by clean-



THE CHAMPION CAR, THE MERCEDES. THIS IS THE FOUR-CYLINDER WHICH DE PALMA DROVE AT ELGIN AND CORONA

RECORD OF CHAMPION CARS AND DRIVERS FROM 1909-1914

Year	Make of car	Started	First	Second	Third	Unplaced
1909	Chalmers	22	5	3	2	12
1910	Lozier	8	4	1	0	3
1911	National	21	9	3	2	7
1912	Flat	12	4	1	0	7
1913	Stutz	15	7	3	1	4
1914	Mercedes	5	3	0	0	2*

*Fourth place each time

CHAMPION DRIVER EACH YEAR

Year	Driver	Started	First	Second	Third	Unplaced
1909	Bert Dingley	7	2	3	1	1
1910	Ralph Mulford	5	2	1	0	2
1911	Harvey Herrick	4	3	0	0	1
1912	Ralph de Palma	5	4	0	0	1
1913	Earl Cooper	6	5	1	0	0
1914	Ralph de Palma	5	3	0	0	2*

*Fourth place each time

ing the card, winning both classics. Pullen failed to finish the first day, but on the second he was runner-up to dePalma, establishing a non-stop record which was beaten only at Corona by Oldfield in the Maxwell. Pullen's championship stock went up a notch at Corona, where he established a world's road racing record that is so sensational that critics still are gasping at the dizzy speed. Stacking up the respective claims of dePalma and Pullen, one must admit that while to the Italian belongs the championship title, yet the most ardent admirers of the Mercedes pilot must admit that Pullen stands very close to the throne.

Oldfield's Consistency Record

Oldfield drove in the same five classics as did his two rivals and he went them one better by participating in the cactus derby in which he carried off the honors. The six starts of the "master driver of the world" netted him one first, two seconds, one third, one fourth and one time not finishing. Surely that is a showing which entitled the veteran to some consideration and so Motor Age hands out to Barney that jewel, the consistency title.

The Oldfield ticket shows that in the Vanderbilt Barney was runner-up to dePalma, a puncture on the last lap slowing the veteran when it looked as if he would break into the limelight. In the grand prix he made a gallant showing as long as he was running. In both these Santa Monica events Oldfield drove a Mercer. At Elgin in a Stutz he landed fourth in the Chi-

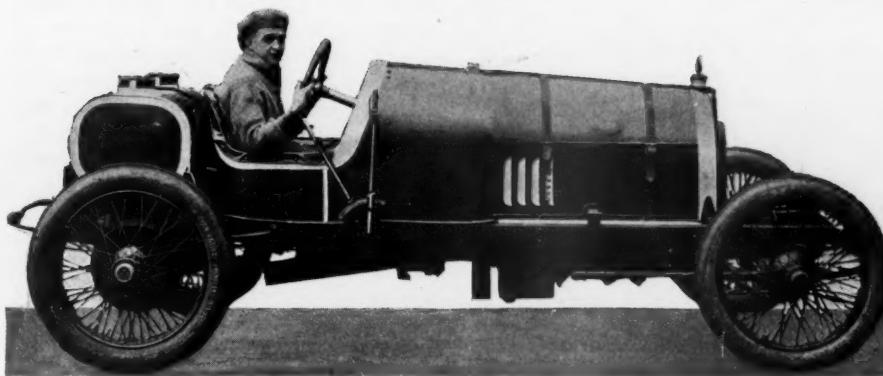
eago Automobile Club cup race and third in the Elgin National. The next big race was the cactus derby and when Oldfield in a Stutz was declared winner in the grueling grind from Los Angeles to Phoenix it marked Barney's first road race victory. Shifting to a Maxwell at Corona he was a gallant second to Pullen.

Louis Nikrent Does Well

Of the 103 different drivers who participated in American road races in 1914 only one other outside of dePalma, Pullen and Oldfield is entitled to any encomiums. That chap is Louis Nikrent of Los Angeles, one of the veterans, who distinguished himself by landing second in the cactus derby in a Paige after a most sensational battle against big odds and being among the finishers at Corona. Gil Anderson showed a flash when he was returned runner-up in the C. A. C. cup race at Elgin. As for Earl Cooper, last year's champion, he figured in the also rans with three starts.

STARTING AND FINISHING

Race	Distance	Starters	Finishers
Elgin National	301	28	5
Grand Prize, Santa Monica	403.248	15	4
Vanderbilt Santa Monica	295	15	4
Los Angeles-Phoenix	696	20	8
C. A. C. trophy, Elgin	311	20	8
Visalia, Cal.	150	14	9
Walla Walla, Wash.	210	13	4
El Paso-Phoenix	533	27	8
Corona, Cal.	301.81	18	7



THE MERCER IN WHICH PULLEN SMASHED THE WORLD'S ROAD RACING RECORD AT CORONA, MOST SENSATIONAL RACE OF YEAR



ED PULLEN, HOLDER OF NEW WORLD'S ROAD RECORD OF 87.8 MILES PER HOUR

COMPARISON OF THE LAST 6 YEARS OF ROAD RACING

	1914	1913	1912	1911	1910	1909
Number of road races.....	9	16	20	27	21	27
Number of miles.....	3,191	3,321	4,645	5,591	4,449	5,100
Average distance of each race.....	354.562	207	232	206	211	211
Average miles per hour each winner.....	58.69	57.76	60.25	63.22	53.8	49.2
Average each car that finished.....	54.91	54.68	54.49	59.51	51.58	50.62
Fastest road race.....	87.86	75.03	78.7	74.62	73.22	69.6
Slowest road race.....	18.26	29.94	23.7	27.03	26.41	24.8
Number of starters.....	170	83	156	202	206	223
Average number of starters.....	17 1/4	5 3/16	7 4/5	7 1/2	9 1/2	8 1/4
Number of cars allowed to finish.....	57	44	71	92	82	94
Percentage of finishers.....	29.90	53.01	45.5	44.8	39.7	42
Number of makes competing.....	47	46	44	44	55	63

FASTEEST RACES EACH YEAR

Year	Race	Distance M.P.H.	Driver and Car
1909	Riverhead, L. I.	113.7	Chevrolet, Buick
1910	Santa Monica	115	Tetzlaff, Lozier
1911	Santa Monica	202	Herrick, National
1912	Santa Monica	303	Tetzlaff, Fiat
1913	Corona	251	Cooper, Stutz
1914	Corona	301.81	Pullen, Mercer

Mulford, another one of Motor Age's champions, has one third, gained at Elgin.

So much for the drivers. As for the work of the cars, that runs along in about the same channel, with the fight between Mercedes and Mercer. While the chief honors undoubtedly belong to the German makers, still one must concede that Mercer unquestionably demonstrated that it was the fastest car in the American road racing campaign. There is no doubt about that, as the reports from Santa Monica, Elgin and Corona verify. In every one of the five big races of the year it was the Mercer that was the front runner, the one that put the spice into the races and which always seemed to have the speed of the party, to use a time-honored phrase once so popular in the turf world.

Mercer Shows Great Speed

One finds that at Santa Monica the Mercer showed phenomenal speed in both the Vanderbilt and the grand prix. In the former Pullen led the field for many laps at an 84-mile-an-hour clip until he turned over. In the grand prix, which Pullen won, it was Wishart who was the early pacemaker. Like his team mate, Wishart fairly flew around the circuit at an 85-mile clip until he burned out a main bearing and retired, leaving it to Pullen to land the big money and gain for the Mercer the honor of being the first road-racing American car to win this international trophy.

At Elgin it was the same story. No one

can gainsay the fact that Wishart would have won the first day except for a broken stanchion on his gasoline tank. He had gone twenty-five of the thirty-six laps at 80 miles an hour and was something like 9 minutes to the good. The next day it was about the same story—Wishart way out in front; then came the accident in which poor Wishart lost his life. As for Corona, that event is still so fresh in the minds of the public that one need not refer to it in detail. The fact that Pullen averaged 87.8 miles per hour tells the entire story. Two firsts and two seconds in fourteen starts is the Mercer showing for the year.

Last year's champion car, the Stutz, upheld its reputation for consistency by getting one first, one second and one third in fifteen starts—not the sensational showing of 1913, it is true, but one that is gratifying, particularly when the Los Angeles-Phoenix race is taken into consideration, a long grind in which Oldfield's Stutz showed real stamina. In this same connection one should not forget the great work of the Paige in the cactus derby in which the Detroit car, a newcomer in the racing game, ran second and third and gained additional credit by making the fastest time from Prescott to Phoenix on the last leg of the course. Nikrent in a Paige really finished first but lost because of having started sooner from Los Angeles than did Oldfield.

This is the sixth consecutive year that

RECORD OF CARS

Name of Car	Start	First	Second	Third	Unplaced
Alco	1	0	0	1	2
Buick	13	0	0	0	2
Cadillac	3	0	1	0	4
Duesenberg	5	0	0	1	1
E-M-F	2	0	0	1	1
Mason	3	0	0	1	2
Marmon	5	0	1	1	4
Maxwell	4	0	1	0	3
Mercedes	5	3	0	0	2
Mercer	14	2	2	0	11
National	3	0	1	0	2
Overland	3	2	0	0	1
Packard	1	0	0	1	0
Paige	2	0	1	1	0
Peugeot	2	0	0	1	1
Pope-Hartford	3	1	0	0	2
Stutz	15	1	1	1	12
Unplaced: Apperson, 2; Beaver Bullet, 1; Braender Bulldog, 1; Burman Special, 1; Chevrolet, 1; Cole, 1; De Dietrich, 1; Fiat, 5; Ford, 6; Franklin, 1; Gordon, 1; Great Western, 1; Gray Fox, 1; Halladay, 1; Isotta, 1; Kastekar, 1; Kisselkar, 2; Lozier, 1; Metropol, 1; Metz, 2; Mitchell, 1; Oldsmobile, 1; Palmer-Singer, 1; Simplex, 1; Sunbeam, 7; Tahis, 1; Thomas, 1; Touraine, 1; Velle, 1; White, 1.					



THE STUTZ WHICH CARRIED BARNEY OLDFIELD TO VICTORY IN THE CACTUS DERBY

Elgin National and the Vanderbilt as reputation-builders, while the Lozier won four firsts and one second in eight starts.

National's 1911 Showing

The National had its big year in 1911 and with a strong aggregation of pilots swept everything before it, finishing the year with the remarkable record of nine firsts, three seconds and two thirds in twenty-one starts, a showing that had not been approached by any other make of car in American road racing history up to that time. Of the National drivers, one, Harvey Herrick, was selected as driving champion with three wins out of four starts, one of which was the Los Angeles-Phoenix desert road race.

The only time in 6 years that the champion car has been other than of the same make piloted by the champion driver was in 1912 when the Fiat was chosen for the honor with four firsts and one second in twelve starts.

The Stutz came into the limelight in 1913 through the great work of Earl Cooper and Gil Anderson. It was a remarkable showing the Indianapolis-made car recorded—seven firsts, three seconds and one third in fifteen starts, the remarkable

BARNEY OLDFIELD, THE CONSISTENCY KING OF THE 1914 SEASON

feature that the seven victories were consecutive ones, constituting a record never before attained by any other make of car.

Review of 1914 Work

Getting up to this year's work, one finds that while there have been fewer road races than ever before, yet the number of starters was 105 per cent greater than in 1913 and the largest since the palmy days of the sport in 1911. The count shows 170 starting in nine races, while in 1911 202 started in twenty-seven events.

Really there only were six events of major caliber—the Vanderbilt and grand prix at Santa Monica, the Chicago Auto-

mobile Club cup and the Elgin National trophy at Elgin; the cactus derby and Corona. While the El Paso-Phoenix desert road race had a large field of starters, yet it lacked class in that no star drivers took part in the grind. The remaining two events listed were only local in their character.

This falling off in the number of road races can best be explained by the fact that nowadays there are few class races. It used to be that at major meets three, four and five different events were run off, but in 1914 the promoters seemed to confine their efforts to the promotion of not more than two. Santa Monica and Elgin are in this category. Corona stood pat on one, while of course, there could be only one class in the desert events.

Fewer Races This Year

Last year San Diego had three road races, Corona had two, while Tacoma with three helped swell the total. This year San Diego was not in the running, Corona only had one, while Tacoma was put into the speedway category by an official ruling made by the contest board of the American Automobile Association. Then, too, there was the Los Angeles-Sacramento road race last year which was not repeated this season. Also there was a race from Albuquerque to Santa Fe, which was abandoned.

Another tendency noted this year was to make the races longer and the nine events this year totaled to within 130 miles of the distance covered in the sixteen races of 1913. This gives 1914 the record average mileage with 354 miles as against 207 in 1913, 243 in 1912, 206 in 1911, 211 in 1910 and 211 in 1909. The average time of all the finishers, too, was better than ever before, the figures giving 54.91 miles per hour as against 54.68 in 1913, 54.49 in 1912, 59.51 in 1911, 51.58 in 1910 and 50.62 in 1909. The average time of each winner, 58.69, though faster than last year's 57.7, still is lower than the 63.22 of 1911 and the 60.25 of 1912. There was a smaller percentage of finishers, however.

One interesting point is that the fields this year were larger than ever before, the

AVERAGE MADE BY EACH CAR FINISHING IN AMERICAN ROAD RACES IN 1914

M.P.H. Dist.	Car	Driver	Road race	M.P.H. Dist.	Car	Driver	Road race		
87.87	301.81	Mercer	Pullen	Corona, Cal.	65.5	301	Burnman Special.	Hearne	Elgin National
86.2	301.81	Maxwell	Oldfield	Corona, Cal.	65.1	301	Stutz	Dearborn	C. A. C. trophy, Elgin
85.5	301.81	Duesenberg	O'Donnell	Corona, Cal.	65.0	301	Gray Fox	Wilcox	C. A. C. trophy, Elgin
85.3	301.81	Mercedes	DePalma	Corona, Cal.	53.6	150	Overland	McKelvy	Visalia, Cal.
84.0	301.81	Gordon	Gordon	Corona, Cal.	53.01	150	National	Briscoe	Visalia, Cal.
78.3	301.81	Maxwell	Carlson	Corona, Cal.	47.45	150	Packard	Campbell	Visalia, Cal.
77.2	403.248	Mercer	Pullen	Grand Prize.	47.29	150	Ford	Pilletin	Visalia, Cal.
76.9	301.81	Mercer	Nikrent	Corona, Cal.	36.5	533	Pope-Hartford	Hugh Miller	El Paso-Phoenix
75.49	295	Mercedes	DePalma	Vanderbilt.	34.1	533	Buick	Hutchings	El Paso-Phoenix
75.06	295	Mercer	Oldfield	Vanderbilt.	32.1	533	Marmon	Brewer	El Paso-Phoenix
73.9	301	Mercedes	DePalma	C. A. C. trophy, Elgin	31.9	533	Stutz	Cornu	El Paso-Phoenix
73.75	301	Stutz	Anderson	C. A. C. trophy, Elgin	30.3	533	Mitchell	C. Miller	El Paso-Phoenix
73.53	301	Mercedes	DePalma	Elgin National	30.2	696	Stutz	Oldfield	Los Angeles-Phoenix
73.2	301	Mercer	Pullen	Elgin National	29.5	696	Paige	Nikrent	Los Angeles-Phoenix
72.7	301	Peugeot	Mulford	C. A. C. trophy, Elgin	27.8	696	Paige	Beaudet	Los Angeles-Phoenix
72.70	295	Mason	Carlson	Vanderbilt	26.9	696	Chevrolet	Durant	Los Angeles-Phoenix
72.28	295	Stutz	Cooper	Vanderbilt	26.4	533	Oldsmobile	Thomas	El Paso-Phoenix
70.9	301	Stutz	Oldfield	C. A. C. trophy, Elgin	26.4	696	Cadillac	Bramlett	Los Angeles-Phoenix
68.5	301	Stutz	Oldfield	Elgin National	25.7	533	Stutz	Gasser	El Paso-Phoenix
68.4	403.248	Marmon	Pall	Grand Prize	25.5	533	Halladay	Deemer	El Paso-Phoenix
67.5	301	Braender B'dog. Chandler	Morris	C. A. C. trophy, Elgin	24.5	696	Buick	Ellis	Los Angeles-Phoenix
66.8	301	Sunbeam	Elgin National	Elgin National	23.4	696	Stutz	Burns	Los Angeles-Phoenix
66.2	301	Marmon	Heinemann	C. A. C. trophy, Elgin	21.7	696	Cole	Du Bois	Los Angeles-Phoenix
65.66	403.248	Alco	Taylor	Grand Prize	20.0	210	Overland	De Vine	Walla Walla, Wash.
65.51	403.248	Mercedes	DePalma	Grand Prize	18.26	210	Cadillac	Lewis	Walla Walla, Wash.

average number of starters in the nine events being $17\frac{3}{4}$ as against the $9\frac{1}{2}$ in 1910. The largest field of the year was in the Elgin National, in which twenty-eight cars started, the greatest number that ever breasted the tape in an American road race over a circular course.

Also the statistics show that while few American makers still support racing teams yet the number of makes represented in road racing is holding its own. This year we had forty-seven makes represented as against forty-six in 1913, forty-four in 1912, forty-four in 1911, fifty-five in 1910 and sixty-three in 1909.

Improvement in Speed

In the matter of speed there has been a general improvement all along the line and it is a matter of note that in each of the five classics the previous record for that particular race was badly beaten. When dePalma won the Vanderbilt his 75.49 miles per hour beat the previous best of 74.07, made by Mulford at Savannah. The grand prix mark of 74.45, made by David Bruce-Brown at Savannah, was raised to 77.2 by Pullen at Santa Monica. DePalma raised the Chicago Automobile Club cup mark from 66.8 to 73.9 and the Elgin National, formerly held by Gil Anderson at 71.5, to 73.53. The old Corona mark was 75.03, held by Cooper; now it is 87.8, held by Cooper.



ABOVE—GIL ANDERSON, STUTZ DRIVER, RUNNER-UP IN CHICAGO AUTOMOBILE CLUB TROPHY RACE AT ELGIN. BELOW—LOUIS NIKRENT, PAIGE DRIVER, SECOND IN CACTUS DERBY

AMERICAN ROAD RACING RECORD FOR SEASON OF 1914

Race	Date	Car	Driver	No. starters	No. finish	Distance	Time	I. M. P.
Elgin, Ill. Elgin National Trophy	Aug. 22	Mercedes Mercer Stutz Fourth Fifth	DePalma Pullen Oldfield Morris Hearne	28	5	301	4:06:18|73.53 4:07:28|73.2 4:24:02|68.5 4:31:09|66.8 4:35:47|65.5	
		Also started: Peugeot, Burman; Maxwell, Carlson; Duesenberg, Alley; Mercer, Henning; Sunbeam, Grant; Stutz, Dearborn; Gray Fox, Wilcox; Marmon, Heineman; Stutz, Anderson; Mercer, Wishart; Maxwell, Tetzlaff; Lozier, Fountain; Braender-Bulldog, Chandler; Chadwick, Burt; Duesenberg, Rickenbacher; Maxwell, Orr; Tahis, Roberts; Keeton, Callaghan; Marmon, D'Alene; White, Calliouette; Great Western, Tidmarsh; White, Luttrell; Rae, Walker.						
Elgin, Ill. C. A. C. Trophy	Aug. 21	Mercedes Stutz Peugeot Stutz Br.-Bulldog Marmon Stutz Gray Fox	DePalma Anderson Mulford Oldfield Chandler Heinemann Dearborn Wilcox	20	8	301	4:05:01|73.9 4:05:45|73.15 4:08:16|72.7 4:15:23|70.9 4:27:58|67.5 4:33:18|66.2 4:37:29|65.1 4:37:43|65.0	
		Also started: White, Shrunck; Mercer, Wishart; Tahis, Roberts; Mercer, Henning; Duesenberg, Alley; Maxwell, Carlson; Sunbeam, Morris; Mercer, Pullen; Maxwell, Tetzlaff; Duesenberg, Rickenbacher; Sunbeam, Grant; Great Western, Tidmarsh.						
Corona, Cal.	Nov. 26	Mercer Maxwell Duesenberg Mercedes Gordon Maxwell Mercer	Pullen Oldfield O'Donnell DePalma Gordon Carlson Nikrent	18	7	301.81	3:26:02|87.86 3:29:58|86.2 3:31:12|85.5 3:31:51|85.3 3:48:29|79.2 3:51:13|77.6 3:55:10|76.9	
		Also started: Mercer, Ruckstall; Stutz, Cooper; Sunbeam, Babcock; Marmon, Cadwell; Duesenberg, Callaghan; Sunbeam, Grant; Stutz, Lewis; Peugeot, Rickenbacher; Stutz, Klein; Klein-King, Ball; Marmon, D'Alene; Duesenberg, Alley.						
Vanderbilt Santa Monica, Cal.	Feb. 26	Mercedes Mason Stutz	DePalma Oldfield Carlson Cooper	15	4	295	3:53:41|75.49 3:55:01|75.06 4:02:39|72.70 4:04:03|72.28	
		Also started: Touraine, Joermann; Alco, Janette; Stutz, Anderson; Marmon, Ball; Mercer, Pullen; Apperson, Goode; Sunbeam, Marquis; Fiat, Verbeck; Mercer, Wishart; Isotta, Grant; Mason, Lewis.						
Grand Prize Santa Monica, Cal.	Feb. 28	Mercer Marmon Alco Mercedes	Pullen Ball Taylor DePalma	15	4	403.248	5:13:30|77.2 5:53:23|68.4 6:08:29|65.66 6:09:08|65.51	
		Also started: Mercer, Gordon; Stutz, Anderson; Mercer, Oldfield; Mason, Rickenbacher; Sunbeam, Marquis; Alco, Janette; Mercer, Wishart; Fiat, Tetzlaff; Apperson, Goode; Stutz, Cooper; Fiat, Verbeck.						
Los Angeles- Phoenix	Nov. 9-11	Stutz Paige Paige Chevrolet Cadillac Bulck Stutz Cole	Oldfield Nikrent Beaudet Durant Bramlett Ellis Burns DuBois	20	8	696	23:00:00|30.2 23:35:00|29.5 25:04:00|27.8 25:46:00|26.9 26:20:00|26.4 28:22:00|24.5 29:48:00|23.4 31:56:00|21.7	
		Also started: Metz, Wing; Kincaid Special, Kincaid; Simplex, Davis; Maxwell, Carlson; Chevrolet, Lawrence; Metz, Foulke; Thomas, Pink; Kisselkar, Anderson; De Dietrich, Sprague; Ford, Schnack; Metz, Snow; Alco, Taylor.						
El Paso-Phoenix	Nov. 8, 9	Pope-Hart. Buick Marmon Stutz Mitchell Halladay Oldsmobile Stutz	Hugh Miller Hutchings Brewer Cornu C. Miller Deemer Thomas Gasser	27	8	533	14:35:48|36.5 15:57:01|34.1 16:37:28|32.1 16:41:34|31.9 17:34:15|30.3 20:53:07|25.5 20:40:56|26.4 20:13:07|25.7	
		Also started: Buick, Joseph; Buick, Leonard; Ford, Wiseman; Kisselkar, Moore; Simplex, Deuel; Buick, F. Turner; Fiat, Adolph; Velle, Naquin; Fiat, Harrell; Buick, Johnson; Ford, M. Miller; Buick, Jack Smith; Pope-Hartford, Tremaine; Metropole, Cater; Lozier, Lester; Palmer-Singer, Ben Turner; Beaver-Bullet, Keene; Cadillac, Bradford; Buick, Freeman.						
Visalia, Cal.	July 4	Overland National Packard Ford	McKelvy Briscoe Campbell Pilletin	14	9	150	2:47:53|53.6 2:49:46|53.01 3:09:40|47.45 3:10:18|47.23	
		Also started: National, DeVore; National, Sprague; Buick, Lawton; Buick, Roemer; Mercer, Pipher; Buick, Lowery; Overland, Watkins; Pope-Hartford, Teaman; Buick, Sulprizio; Kasterkar, Kaster.						
Spokane-Walla Walla, Wash.	Sept. 16	Overland Cadillac E. M. F. E. M. F.	DeVine Lewis Lutz Morrill	13	4	210	10:30:00|20.0 11:30:00|18.26	
		Also started: Franklin, Conline; Buick, Welch; Ford, Mueller; Ford, Wright.						

Lautenschlager the Champion Driver of Europe

Mercedes' Victory in Grand Prix Settles Title



SISZ, WINNER OF FRENCH TOURING CAR
ROAD RACE

WAR brought to a sudden end the road racing program in Europe and stopped all motoring activity in the sport line. This was disappointing because foreign makers had evinced an interest in racing that promised to boom the sport in 1915. Still there were five racing contests of importance, chief of which was the French grand prix, which proved to be a grand revival of that ancient classic. In addition, England resurrected its Tourist trophy race on the Isle of Man; the Targa Florio was run in Sicily, the Florio cup also was contested by the Italians, while in the way of a novelty, France pulled off a road race for touring cars.

Lautenschlager European Champion

If one were to attempt to pick a champion from these results one would find it hard sledding, because Nazzaro was the only one of the stars who drove in more than one race. Therefore, because of its international complexion, it is necessary to use the grand prix as the race which developed the champion European car and driver. Undoubtedly this long grind was truly representative, because the race attracted thirty-seven starters, the pick of the world, one might say, for numbered

FROM LEFT TO RIGHT—GUINNESS, WINNER OF TOURIST TROPHY RACE; LAUTENSCHLAGER, WINNER OF FRENCH GRAND PRIX; NAZZARO, WINNER OF FLORIO CUP

among the drivers was de Palma, America's best.

Using the grand prix as the scales on which to weigh the championship timber, the critics must award the title to Herr Lautenschlager, a come-back champion, if you please, for it was this same sturdy German who won the 1908 French grand prix, a result which so depressed France

that the classic was abandoned for several years. And coupled with this selection, the champion car title necessarily must be awarded to the German Mercedes, which Lautenschlager drove. Inasmuch as the Mercedes is adjudged the champion in America this year, it would seem that it had clearly won the right to be called champion of the world.

EUROPEAN ROAD RACING RECORD FOR SEASON OF 1914

Five Big Speedway Races Run in America in 1914

Rene Thomas Winner of Indianapolis Event



FROM LEFT TO RIGHT—COOPER, WINNER OF THE TACOMA MONTAMARATHON; RENE THOMAS, WINNER OF INDIANAPOLIS RACE; RICKENBACHER, WINNER AT SIOUX CITY

It is doubtful if a more sensational road race, from a competition standpoint, ever has been run than this same grand prix of 1914, for it marked the utter rout of the French, heretofore regarded as invincible. Mercedes sent seven cars into the fray and ran one, two, three. The Germans went at it in a most businesslike way, utilizing four of their cars to goad the French and get them to push their cars beyond their capabilities. The mighty Boillot, champion for 2 years, bore the brunt of the fight and so fierce was it that he "blew up" on the last lap and never finished. Goux was the first French driver in, and he got only fourth. De Palma in an English Vauxhall figured among the also-rans because of mechanical troubles early in the race.

Grand Prix Slow Race

The race was slow, compared with present standards, but it must be remembered that the race was 467 miles in length and over a tortuous course. In one stretch of 8 miles there were eighty turns, so the average of 65.5 was good.

The English returned to the racing game with their Tourist trophy race on the Isle of Man, a 2-day affair at 600 miles and over a course which included many miles of mountain climbing. The victor was Lee Guinness in an English Sunbeam, while Minerva-Knight ran second and third.

The Targa Florio is the oldest of the racing classics and is run in Sicily over an extremely mountainous course. In fact it is more like an endurance contest than a road race and might be compared with our desert affairs. Ceirano in a Seat won this year at 36.58 for the 620 miles. In the Florio cup, another old race that has been put back on the calendar, Nazzaro, once champion of Europe, came back into the limelight with a well-earned victory.

SPEEDWAY racing seems to have come into its own, for this year there were five races in this category, each won by a different driver and car. Indianapolis' 500-mile race was won by Rene Thomas in a Delage; Sioux City's 300-mile race went to Rickenbacher in a Duesenberg; while at Tacoma, which now is classed as a speedway by the A. A. A., the winners were Cooper in a Stutz, Hughes in a Maxwell, and Parsons in a Frantz, which is said to be a rebuilt Stutz.

This activity carries the fans back to 1910, when there were three speedways in operation—Indianapolis, Atlanta and Los Angeles—and presages much for next year, when one can reasonably expect to see the speedway world augmented by big tracks at Minneapolis, New York, Omaha and possibly Chicago and Philadelphia.

Racing on 1-mile circular tracks also experienced a boom this year through the promotion of a series of 100-mile races, in which there was real competition, involving Burman, Mulford, de Palma and Bergdoll and bringing into prominence such promising youngsters as Alley and O'Donnell. It is remarkable that in each of these four centuries the 100-mile dirt track record was broken. Starting with de Palma's 1:40:15 at Brighton Beach, the mark was hammered to 1:34:29 by Burman at Kalamazoo; to 1:32:54 at Galesburg, and to 1:31:30 by Alley at Minneapolis.

New Speedway Records Made

The speedway competition was responsible for the establishing of a new set of competition marks in the annual 500-mile race at Indianapolis, which again was won by a foreigner, this time Rene Thomas in a Delage, whose time of 6:03:45, an average of 82.47 miles per hour, beat the National's record, which was established by

PARSONS, ONE OF THE TACOMA WINNERS

Dawson in 1912, of 6:21:06, an average of 78.7. The next three were foreigners; then came Barney Oldfield in the Stutz, the first American car to finish. It was in this race that Dawson met with an accident that nearly cost him his life. Also the 1914 classic was remarkable for the establishing of an attendance record, it being estimated that 93,000 spectators paid to see the international battle.

Results at Sioux City

Sioux City is classed as a speedway because of the size of the track. The oval is 2 miles in circumference and is made of gumbo mud, which proved lightning fast, for in the 300-mile race on the Fourth of July Rickenbacher averaged 78.6 miles per hour and beat a field that included nearly every American driver that ran at Indianapolis, while in the car line both Peugeot and Delage were represented.

The Tacoma meet clashed with Sioux City and was a 2-day affair. Cooper showed a flash of his last year's form here and won one of the three races that were run.

It would be useless to attempt to pick speedway champions, because there were so few events and because the competition was not general enough; that is, not enough of the stars swung around the circuit. Only at Indianapolis and Sioux City

did the same men clash and the honors were so well divided that no one man or one make of car could claim anything.

On the dirt track circuit, counting the 100-mile races only, one can be more definite, for there can be no gainsaying the fact that the Duesenberg made the best showing among the cars. One, two, three at Minneapolis; one, three and four at Galesburg, and second at Kalamazoo is a showing equalled by no other make of car. This, too, included twice breaking the record for the century.

Mulford, Alley and O'Donnell about split individual honors, Mulford having the edge through one first and a second. Alley had one first and a third, and O'Donnell a second, third and a fourth. Alley's 100-mile record, which was made in the Minneapolis race, has just been accepted by the contest board of the American Automobile Association.

BUICK IN NEW KIND OF TEST

San Francisco, Cal., Dec. 3—A Buick model C 25 touring car has successfully completed a 1,000-mile sealed radiator test. The car was driven by C. A. McGee and Frank Murray of the Howard Automobile Co. and Frank Hermann and Ed Crinion, newspaper men of San Francisco and Oakland, respectively, acted as official observers.

The run was made between San Francisco and Los Angeles by way of the Tehachapi and Tejon passages and took the car over some steep grades and some rough valley roads now in course of construction.

The trip was made in two sections; the run to Los Angeles took 24 hours, where a lay over was made for a couple of days and the trip back to San Francisco took 27 hours.

While in Los Angeles the car was placed on public exhibition with the seals affixed in San Francisco unbroken. When the car returned to the latter place, the seals were smashed and it required but 1 quart of water to refill the radiator, notwithstanding the hard tests to which the car had been subjected.

On the trip back to San Francisco to test the engine stability as well as the cooling system, the hood of the little car was sealed by Barney Oldfield and the car made the run back without once lifting the hood or disturbing the seal.

HENRY B. JOY CONVALESCING

New York, Dec. 7.—Henry B. Joy, president of the Packard Motor Car Co., is convalescing in Roosevelt hospital, New York, having undergone a minor operation. Mr. Joy, while on a test trip with an experimental car, sustained a bump on his head, resulting in a painful bruise. Several days later symptoms developed indicating that slight surgical treatment was necessary. It is expected that the Packard executive will be discharged from the hospital within a very short period.

RESULTS OF AMERICAN SPEEDWAY RACES

Race	Date	Car	Driver	No. Starters	No. Finish	Distance	Time	M. P. H.
Indianapolis	May 30	Delage	Thomas	30	13	500	6:03:45	82.47
	Second	Peugeot	Duray				6:10:29	80.99
	Third	Delage	Guyot				6:14:01	80.30
	Fourth	Peugeot	Goux				6:17:24	79.41
	Fifth	Stutz	Oldfield				6:23:51	78.15
	Sixth	Excelsior	Christians				6:27:54	77.44
	Seventh	Sunbeam	Grant				6:36:22	75.69
	Eighth	B'ver Bullet	Keene				6:40:57	74.82
	Ninth	Maxwell	Carlson				7:02:42	70.96
	Tenth	Duesenberg	Rickenbacher				7:03:34	70.83
	Eleventh	Mercedes	Mulford				7:11:19	69.55
	Twelfth	Duesenberg	Haupt				7:29:57	66.67
	Thirteenth	Keeton	Knipper				7:36:42	65.65

Also started: Peugeot, Bolliot; Bugatti, Friedrich; Burman, Disbrow; Mercer, Wishart; Stutz, Cooper; Mercer, Bragg; King, Klein; Braender, Chandler; Gray Fox, Wilcox; Mason, Mason; Marmon, Dawson; Burman, Burman; Stutz, Anderson; Isotta, Gilhooley; Maxwell, Tetzlaff; Sunbeam, Chassagne; Ray, Brock.

Sioux City, Ia.	July 4	Duesenberg	Rickenbacher	17	9	300	3:49:02	78.6
	Second	Mercer	Wishart				3:49:50	78.3
	Third	Duesenberg	Alley				4:02:10	74.3
	Fourth	Marmon	Patschke				4:02:56	74.2
	Fifth	Stutz	Anderson				4:03:34	73.8
	Sixth	Delage	Knipper				4:31:07	66.3
	Seventh	Gray Fox	Wilcox (still run'g)					
	Eighth	Braender	Chandler (still run'g)					
	Ninth	White	Shrunk (still run'g)					
	Tenth	Chalmers	Wetmore (still run'g)					

Also started: Sunbeam, Grant; Sunbeam, Babcock; Stutz, Oldfield; Peugeot, Burman; Peugeot, Stringer; Peugeot, Mulford; Mason, Mason.

Tacoma Montana Marathon	July 4	Stutz	Cooper	14	5	250	3:24:34	73.44
	Second	Mercer	Ruckstall				3:32:33	70.57
	Third	King	Klein				3:34:22	69.89
	Fourth	Frantz	Parsons				3:45:20	66.57
	Fifth	Alco	Taylor				4:17:12	64.8
		Hupmobile	Smiley (still run'g)					

Also started: Ono, Dingley; Maxwell, Hughes; Maxwell, Tetzlaff; Ray, Brock; Mercer, Pullen; Fiat, Verbeck; Fiat, Sorrell; Maxwell, Carlson.

Tacoma Potlach	July 4	Maxwell	Hughes	14	6	200	2:41:32	74.28
	Second	King	Klein				2:41:36	74.25
	Third	Stutz	Cooper				2:44:01	73.26
	Fifth	Mercer	Ruckstall (no time taken)					
	Sixth	Frantz	Parsons (no time taken)					

Also started: Marmon, D'Alene; Chalmers, Kennedy; Mercer, Pullen; Maxwell, Tetzlaff; Ray, Brock; Maxwell, Carlson; Fiat, Verbeck; Itala, Welch.

Tacoma Intercity	July 4	Frantz	Parsons	11	6	100	1:21:29	73.6
	Second	Ray	Brock				1:31:22	65.7
	Third	Lozler	Latta				1:32:33	64.8
	Fourth	Studebaker	Staley				1:39:37	60.23
	Fifth	Chevrolet	Croston (no time taken)					
	Sixth	Hupmobile	Smiley (no time taken)					

Also started: Mercer, Thomas; Romano, Barnes; P. C. Special, Terrien; Hudson, Schneider; National, McGoldrick.

IMPORTANT 100-MILE RACES ON 1-MILE CIRCULAR TRACKS

Minneapolis, Minn.	Oct. 24	Duesenberg	Alley	7	4	100	1:31:30	65.5
	Second	Duesenberg	Mulford				1:32:34	64.8
	Third	Duesenberg	O'Donnell				1:33:32	64.1
	Fourth	Mercedes	DePalma (no time taken)					

Also started: Peugeot, Burman; Keeton, Callaghan; Great Western, Tidmarsh.

Galesburg, Ill.	Oct. 22	Duesenberg	Mulford	10	5	100	1:32:54	64.6
	Second	Peugeot	Burman				1:33:08	64.4
	Third	Duesenberg	Alley				1:33:37	64.1
	Fourth	Duerenberg	O'Donnell				1:37:33	
	Fifth	Keeton	Callaghan				1:37:41	
		Gt. Western	Tidmarsh (still running)					

Also started: Mercedes, DePalma; Burman, Gable; Fiat Tornado, Gunning; Mercer, Rawlings.

Kalamazoo, Mich.	Sept. 26	Peugeot	Burman	12	4	100	1:34:29	63.5
	Second	Duerenberg	O'Donnell				1:35:32	62.8
	Third	Delage	Newhouse				1:50:45	54.2
	Fourth	Keeton	Callaghan				1:51:14	
	Fifth	Marmon	d'Alene (still running)					
	Sixth	F. S. nec.	G. Bergdolt (still running)					
		Cornelian	Kennedy (still running)					
		Duesenberg	Alley (still running)					
		Maxwell	Carlson (still running)					

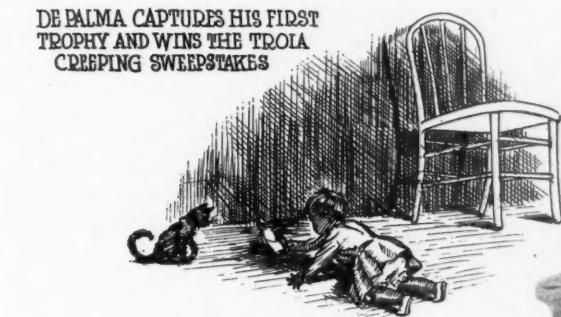
Also started: Great Western, Tidmarsh; Mercedes, DePalma; Benz, E. Bergdolt.

New York, Brighton Beach	Sept. 7	Mercedes	DePalma	100	1:40:15	59.8
	Second	Erwin	Bergdolt			
	Third	Chevrolet	Jessop			

Ralph de Palma, Twice Crowned Champion of the Road

Sketch of the Man Who Has Helped Make Racing History

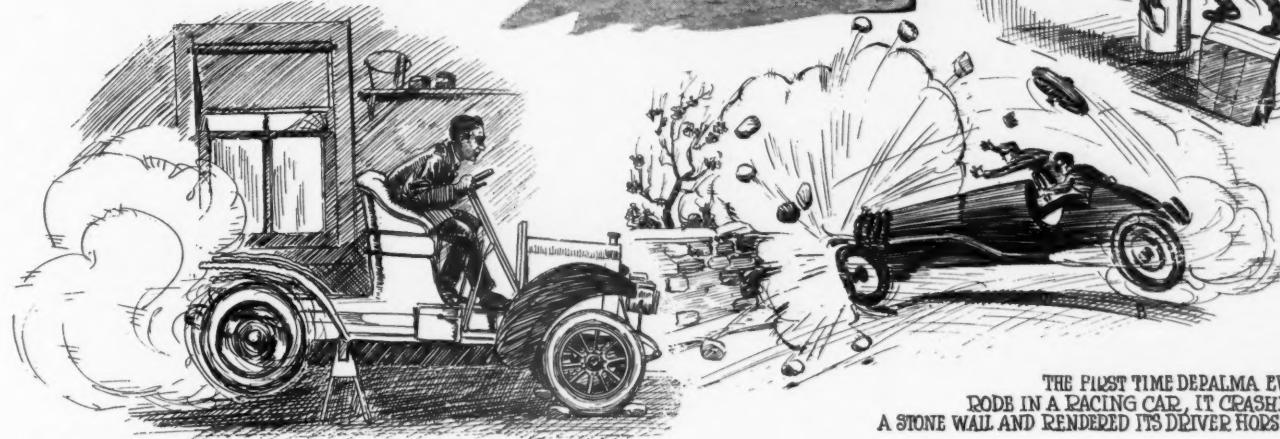
DE PALMA CAPTURES HIS FIRST TROPHY AND WINS THE TROIA CREEPING SWEEPSTAKES



DE PALMA'S TRAGIC DEFEAT AT INDIANAPOLIS IN 1912 IS AN EPIC



AS A BARBER, RALPH NEVER WON MANY MEDALS



THE FIRST TIME DEPALMA EVER RODED IN A RACING CAR, IT CRASHED INTO A STONE WALL AND RENDERED ITS DRIVER HORS DU COMBAT.

TRAVELING AT THE SPEED OF SIXTY MILES AN HOUR WITHOUT MOVING A FRACTION OF AN INCH

MENTION Italy and you think of garlic and hurdy-gurdies while an endless pageant of heroes troop through the mind, countless immortals but partially concealed in the dust of twenty or more centuries, historic valiants that range from Romulus and Remus and the Gracchi of Roman mythology to Dorando, Mariutch and Bigga Brudda Sylves of ragtime song renown. And not the least of these is Ralph de Palma, swarthy-skinned son of the Latins, who now rides high on the crest of fame and has yet to flounder for the first time in the trough of obscurity.

"Arma virumque cano, Troia que primis ab oris—"

Comes from Shores of Troia

Stealing the Hon. Mr. Virgil's stuff may be considered a heinous crime by some critics, but I feel that I am justified in appropriating the opening line of his immortal Aenid, for I, too, "sing of the arms and the hero, who first from the shores of Troia" came to America to gather fame and golden talents on track and road while driving a type of self-propelled chariot of which the Hon. Mr. Virgil never dreamed.

I sing of arms that are muscular, arms that guide obdurate mechanical monsters of steel, arms that have been piled high with prized trophies. I sing of a hero as great in defeat as in victory, a hero who has been crowned with the bay and olive

By J. C. Burton

in nine speed classics, a hero that has twice been hailed as the champion of all America's road race drivers.

Ralph de Palma was born to wear the winged cap and winged sandals of Mercury. In the little Italian village of Troia, where 31 years ago Peter and Maria de Palma celebrated the arrival of a son, he won the free-for-all creeping championship before the lone candle on his first birthday cake was lighted. When he learned to walk, he easily outdistanced all the other toddlers of the seacoast town. At school, while the other children were wrestling with the spelling of "cat" and "dog," he was mastering such words as "velocity" and "celerity." His favorite bedtime story was that of the wonderful seven-league boots and at night he dreamed that he was wearing them.

Nine When He Crosses Atlantic

The call of America, heard and heeded by Peter de Palma when Ralph was 9 years of age, took from Italy a hero in the making. One spring day the future king of speed said good-bye to the olive trees and the blue skies of his native land and sailed, with his father and mother, from Naples. Ten days on the Atlantic, 10 hours on Ellis island and 10 minutes on a trolley car, and the de Palmas had reached

their new home—Brooklyn, N. Y. When the Dodgers trail in the National league and its baby carriages disintegrate, Brooklyn can boast of being the adopted home of de Palma.

Tries to Be a Barber

Had Peter de Palma had his way some 20 years ago, Ralph de Palma today would be a barber instead of a race driver of international fame. Wishing his sons to learn a trade, Ralph's father opened a tonsorial parlor in Brooklyn and put them all to work with shears and razors. Ralph was so small that he had to stand on a soap box to lather a customer's face and he cut the strops to ribbons at the high speed with which he attempted to put an edge on the razors. He was not destined to be a success as a barber, however. He lacked the barber's greatest asset, the gift of conversation.

For 6 years after his arrival in America, walking and running satisfied Ralph's appetite for speed, but when he reached the age of 15, he came to the conclusion that life would be very drab and very slow indeed unless he had a bicycle. One evening, when his father seemed in an exceptionally good humor, Ralph demanded a wheel. The demand was not met. Consequently Ralph left school and got a job in a grocery store at a salary of \$20 a month and board. With the first money he earned, he bought on time a bicycle from

F. A. Baker, the New York agent for the Pierce, and started in pursuit of fame.

Scorching on the boulevards took up much of the time that de Palma should have spent weighing sugar and wrapping up coffee and before the last payment was made on the bicycle, he was informed by the flinty-hearted grocer that his services no longer were needed. Ralph not only had lost his job and his meal ticket but he had visions of losing what he prized even more, the wheel.

Ralph de Palma always has been on the square. He was in this crisis. He wrote to Baker, informing him that he was unable to make the customary monthly payment and offering to return the bicycle. Baker was just as fair. He told the boy, who was destined to become a champion, that he could come to work in the Pierce store and meet his obligation in that way. De Palma accepted the offer and proved to be a valuable repairman, being a born mechanician.

A Bicycle Rider in 1898

De Palma made his debut as a bicycle rider in 1898. He first entered the lists as an amateur and soon became a feared and triumphant competitor at the meets held at Manhattan Beach, Valesburg, N. J., Seaside Park, Fitzhugh Hall, Rochester, and the Madison Square Garden, where, in 1901, he finished second in the race for the 1-mile amateur championship. So successful was he in sprints for cups and trophies that he turned professional in 1902 and started to pedal for money. His most notable victory of that year was the winning of the 12-hour race at Rochester, where he defeated such stars at Nat Butler, Ray Duer and Floyd Krebs.

When he came to balance his books in the winter of 1902, de Palma discovered that he had laid his hands on a very lean part of the fortune supposed to be gained through bicycle racing and again entered the employment of Baker, who that season took on two new lines—the Indian motorcycle and the Pierce motorette. Here were two vehicles that appealed to de Palma with his insatiable hunger for speed. He became a convert to motorcycle racing in 1903, riding one of the first Indians ever turned out by George Hendee, and campaigned on the eastern tracks for 2 years until suspended for competing under an assumed name.

In the meantime, de Palma had learned to drive a motor car. The owner, Baker, refused to allow the enthusiastic Italian to experiment with his one-cylinder idol on the streets, but finally permitted Ralph to jack up the rear wheels and run the car stationary in the shop of the bicycle store. Thus did de Palma, who was soon to drive at a speed man should not dare, learn his first lesson in advancing the spark, shifting the gears and applying the brakes. You might search a long time before finding a more ironical picture than that of America's greatest driver 10 years ago stepping on the accelerator of a puff-

ing buckboard that did not move a fraction of an inch. There is only one vision approaching it—John D. Rockefeller borrowing earfare.

For 3 years lack of opportunity applied the brakes to de Palma's latest ambition, and then, in the fall of 1907, a kind fate released them. The Italian accepted a position as an assembler in the Allen-Kingston plant and was put to work building three racing cars which the company was constructing for the Briarcliff road race, scheduled to be run the following spring. Al Campbell, a former Mercedes driver who had been engaged by the Allen-Kingston company to wear its colors in the contest for the Briarcliff trophy, took a fancy to the young Italian and made him his mechanician. De Palma was attaining his goal.

An accident in practice, in which Campbell's car crashed into a stone wall and the driver sustained a broken leg, made de Palma a full-fledged knight of the khaki. At the proverbial eleventh hour, the neophyte of the Allen-Kingston team was chosen as Campbell's substitute and in the gray dawn of the morning of April 24, 1908, he was sent away by Starter Wagner to give battle to Strang, Cedrino, Lytle, Sartori, Oldfield, Robertson and other pilots, equally as famous and experienced, on a course that is noted to this day for its tortuous turns. De Palma never finished his first race. He had completed four of the eight laps and was running in seventh place when he ditched his car and bent the front axle so badly that he was forced to abandon the pursuit of Strang, the ultimate victor.

De Palma's showing in the Briarcliff race satisfied his employers that he had the courage and skill that makes a great driver and he was given the Allen-Kingston car to campaign on the dirt tracks. The Italian immediately justified the confidence that had been placed in him. In his dirt track debut at Boston, May 30, he defeated Barney Oldfield, then considered unbeatable, and Harry Grant in a 5-mile race and took second money in two other contests on the card.

Success Comes Early

After tasting the sweets of victory once, de Palma hungered for more. He went to Elkwood Park, N. J., and there captured the 25 and 50-mile races and finished second in the 100-mile event. St. Paul was the scene of his next triumphs. In the smaller of the twin cities he cleaned up the card and the man who trailed him in the 5, 10 and 25-mile races was Barney Oldfield.

The death of Emanuel Cedrino in the summer of 1908 left the Fiat Cyclone without a driver. Hollander and Joseph, the American agents for the Italian car, paid court to de Palma and wooed him away from the Allen-Kingston. With a faster mount, de Palma was ambitious to shatter records. Before the first fall of snow, Italy had cornered the American

speed market and the novice who had driven his first race over the Briarcliff course in May was awarded the circular track championship by the American Automobile Association.

The world's mile record of 52 seconds, held by Strang and the Christie, was the first to fall before de Palma and the Fiat Cyclone, the Italian alliance circling the St. Paul track in 51½ seconds. Incidentally Walter Christie was defeated in two straight heats in a match race. At Brighton Beach, the car and driver from the land of the olives were invincible, capturing three events. At the same meet, a family quarrel was settled, the Fiat Cyclone proving itself faster than its twin brother, the Fiat Tornado—George Robertson up—in a match race of 10-mile heats.

Providence speed fanatics next heard the triumphant roar of the Fiat Cyclone and saw de Palma win the 5-mile free-for-all handicap and the 25-mile free-for-all, new world's records being established in the former event. The Cyclone tore up the dirt of the Readville track in two 25-mile races, in one of which de Palma added the scalp of Charles Basle to his collection, and in the other he eclipsed all previous marks from 15 miles up.

Fast Work at Savannah

Flushed with his success on the dirt tracks and wearing the crown of the A. A. A. champion, de Palma entered the Savannah grand prize before going into retirement for the winter. He failed to carry off any of the prize money, but was awarded a diamond-studded medal for turning the three fastest laps, his best average for the 25.13-mile circuit being 69.7 miles per hour. He led the all-star field for the first 50 miles and although continually forced to stop at his pit to correct lubricating troubles, finished the 402-mile grind in ninth place.

In a firmament of speed stars, de Palma was the season's meteor.

The following year, 1909, saw de Palma crowned victor in a road race for the first time in his short but spectacular career. Driving the Fiat Cyclone in the contest for cars selling for \$4,001 and up, he won the stock chassis championship in his class at Riverhead, L. I., averaging 62.4 miles per hour in his triumphant journey of 227.5 miles and incidentally hanging up a non-stop record, as he was not forced to halt at his pits once for fuel and tires or to make mechanical adjustments. He also entered the Lowell road race, in which the persistent jinx, which has trailed him ever since, first singled out the Italian as his special prey. On the last lap of this contest, when Ralph was only 48 seconds behind George Robertson, the winner, the connecting rods of the Fiat went through the crankcase and de Palma was relegated from runner-up to also ran.

The Riverhead and the Lowell contests were the only road races in which de Palma competed that season. He confined his activities to the dirt tracks, on which he

repeated his victories of 1908, eclipsed his record-breaking feats of the year before and again earned the title of A. A. A. circular track champion. He hung up a new world's mark at Daytona in March, when he covered 120 miles in 1 hour 33 minutes 44 $\frac{1}{2}$ seconds, an average of 76.77 miles per hour. At St. Paul, he drove the mile in 51 minutes flat, clipping $\frac{1}{2}$ second off his own record. In fact, from March to October, R. de Palma was busy bettering the records of Ralph de Palma.

Still Speed King in 1910

De Palma continued to reign as king of the dirt tracks in 1910. Many pretenders there were to challenge the supremacy of the Italian speed monarch and the Fiat Cyclone, but all were powerless to wrest from the head of the swarthy-skinned driver the A. A. A. crown. Just to relieve the monotony of breathing dust daily, Ralph entered the 24-hour race at Brighton Beach in August and took third place. He also hurled a defi at the galaxy of Europeans who crossed the Atlantic to compete in the grand prize. In the Savannah classic, de Palma learned that a race never is won until the checkered flag drops. He was leading by 2 minutes on the last lap when his cylinders blew out and the jinx that triumphed at Lowell again chortled with glee.

Just before the opening of the 1911 season, de Palma decided to become a free lance. He switched his allegiance from the Fiat to the Simplex, the same car that Louis Disbrow now is campaigning as the Zip. The Italian tuned up his new mount by driving in five or six early dirt track meets without getting a blot on his escutcheon and then shipped to Indianapolis to compete in the first 500-mile race to be run on the Hoosier speedway. After winning sixth place in the Memorial day classic, de Palma migrated to Elgin, where he failed to finish inside the money in the stock car championships of that year.

De Palma sold the Simplex and like the well-known Mr. Micawber, waited for something to turn up. He did not wait long. The

"something" turned up in the person of E. J. Schroeder, the Jersey City sportsman, who had entered his Mercedes in the Vanderbilt cup and grand prize races, but was without a driver. The position was offered to de Palma, who accepted, and Schroeder soon discovered that his selection was wise, for the Italian finished second in the Vanderbilt cup and third in the grand prize.

De Palma's record from 1912 to the present time is so commonly known that passing mention should suffice. His defeat at Indianapolis in the 500-mile race of 1912 is an epic. His five victories in 3 years at Elgin and his successive triumphs in the Vanderbilt cup classic marked him as the most consistent driver racing in America today. He twice has crossed the Atlantic to compete in the French grand prix. He won the light-car race at Santa Monica in 1912. He escaped death by a miracle at Milwaukee the same year, when he crashed into Bragg's Fiat on the last lap of the grand prize struggle.

Twice Motor Age's Champion

What have been his rewards for all this daring, all this Spartan endeavor?—the knowledge that he holds a record that never has been equaled in the history of the sport. He twice has been selected as the champion road driver of America by Motor Age. He has won more speed classes—nine in all—than any driver in this country or Europe. With Harry Grant, he alone can boast of having captured the

Vanderbilt cup twice in succession. He has proven his supremacy on the road as well as on the dirt track.

De Palma deserves his victories. They are the rewards for persistency in the face of failures and handicaps and for close attention to detail. He doesn't know what it is to quit. There isn't a bit of "yellow" in his makeup. The loss of the 1912 Indianapolis race cost him \$30,000 in prize money, a loss that would have broken the spirit of any other driver under the same circumstances.

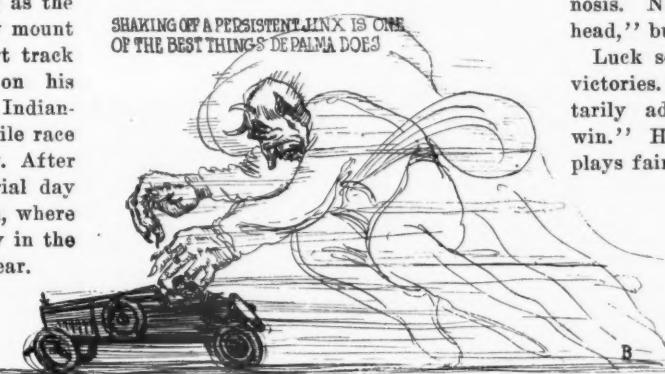
Modest, Unassuming, Daring

The champion of champions is as modest and unassuming as he is daring and tenacious. He neither brags in victory nor whines in defeat. On the eve of a big race, instead of telling what he is going to do, he is getting ready to do it. In his racing camp, the rasp of file and the blow of hammer can be heard long after his competitors have locked their garage doors. When the starting bomb is fired, dePalma's car usually is one of the best sounding rigs in the field.

De Palma is an analyst. One, sometimes 2, weeks before a race he is on the course testing his car and learning each turn. On the day of the race he knows how long his tires will last, how many laps he can negotiate before having to stop for fuel, the speed his engine will develop, on what stretches he can make the fastest time, the spots in the road where he must slow down. He makes the most careful diagnosis. Not only does he never "lose his head," but he always "uses his head."

Luck seldom is a factor in de Palma's victories. Even defeated drivers voluntarily admit that "Ralph deserved to win." He is without an enemy because he plays fair, observing the rules of the road and never taking advantage of those rivals who are trying their best to beat him.

Ralph de Palma is a great champion. But he is something more. He is a true sportsman, bred in the deep purple.



Report Shows 672 Trucks Shipped Abroad in October

War Brings About Shipments Worth \$2,286,964

WASHINGTON, D. C., Dec. 8—Special telegram—The large demand for commercial cars, as a result of the European war, is shown in the October exports, made public today by the federal bureau of statistics. In that month 672 commercial cars, valued at \$2,286,964, and 732 pleasure cars, valued at \$768,387, were exported, as against seventy-nine commercial cars, valued at \$129,506, and 1,697 pleasure cars valued at \$41,663,716, exported in same month last year.

The exports for 10 months ending October, last, were: 1,309 commercial cars, valued at \$3,353,509, and 20,262 pleasure cars valued at \$17,888,351.

The postoffice department will open bids December 16 for furnishing pneumatic, solid or cushion tires for the post-office motor cars. Information for bidders will be furnished by the purchasing agent of the department, this city.

The Duplex Power Co., Charlotte, Mich., has been awarded the contract of furnishing the quartermaster's department, war department, two four-wheel-drive trucks.

MOTOR AGE
Published Weekly by
THE CLASS JOURNAL COMPANY
910 SOUTH MICHIGAN AVENUE CHICAGO

Entered as Second-Class Matter September 19, 1899, at the Postoffice at Chicago, Illinois, under Act of March 3, 1899.

Member of the Audit Bureau of Circulations

NEW YORK OFFICE
239 West 39th Street

SUBSCRIPTION RATES
United States and Mexico \$3.00 per year
Other Countries including Canada \$5.00

Motor Age's Racing Review

FOLLOWING a custom inaugurated 6 years ago, Motor Age this week presents its annual review of racing for the season of 1914, picking an American road champion and also reviewing the European situation, accompanying the article with reliable statistics which cover the field fully. In addition there is presented a brief review of the various speedway events in this country, while the more important dirt track races are touched upon.

THIS selection of a champion driver is undertaken by Motor Age for the reason that no provision is made by the governing body to bestow the title on the deserving one. That the decision rendered by Motor Age is accepted by the motoring public as authoritative has been demonstrated in the past, for not once the 5 years preceding this year's announcement has the finding of this paper been questioned.

IN naming Ralph de Palma as the American road racing champion of 1914 it is believed that the public will coincide with the view of Motor Age, for three firsts in five starts—and all those in the fastest company—and the other two times finishing fourth is a record that unquestionably gives de Palma an edge on his closest rival, Pullen. The latter also is deserving of recognition because of his brilliant work, but he has lacked the consistency shown by de Palma. Also Barney Oldfield is to be complimented for the remarkable showing he has made during the past year.

THE finish of the 1914 season finds the sport in a surprisingly flourishing condition, while the outlook for 1915 seems to promise the best year racing ever has known. The American Automobile Association has shown its ability to cope with the situation and has instituted a number of reforms which indicate progress. One of these has been made in order to protect the drivers and the backers of the sport, and took the form of an insistence that donors of accessory prizes place the offering in the hands of the A. A. A., which in turn would see that the drivers lived up to their agreement in the use of the accessories in question. Drivers have received their prize money promptly.

IT has been demonstrated that where there is real competition such as was had at Kalamazoo, Galesburg and Minneapolis in the 100-mile races run in those cities, that dirt track events can be made really interesting, and that next year there should be an opportunity for at least three or four such meets being run off with success. It also has been demonstrated that the A. A. A. can make for safety in scoring by insisting that the pits at both road races and speedway events be placed beyond the tape instead of before the tape is reached. In the latter case checkers sometimes are confused and give an extra lap to a driver who has stopped at his pits for a time. But that is something easily remedied and it is believed that most promoters will change this system another year.

Some Foreign Trends

NOTWITHSTANDING the fact that the present European war has resulted in a practical discontinuation of motor car manufacture in France, Germany, Belgium and England, yet in France and England there has been brought out this fall several new 1915 models, which were perfected before the outbreak of the war, and these have been brought through, as much to represent a continuity of the industry as to really market cars.

AN analysis of the specifications of these cars recently published in our English contemporary, the Autocar, shows that had 1915 been a normal season, the cars would have represented practically a continuation of the 1914 models with a continuation of those lines of progress that were exemplified a year ago. In this respect is noted a very general adoption of the small car, a car that occupied more or less uncertain position and design a year ago, but which today is a much more definite quantity. This small car a year ago was in the majority of cases a cross between a miniature car and what we have known as the cyclecar. Today this car is in nearly every case a real miniature car, a construction with a four-cylinder motor, with a flywheel clutch, with a two or three-speed gearset and with a shaft-driven transmission system. The light cyclecar idea has practically vanished and with it has gone the small air-cooled motor that was being considered so seriously 12 months ago. In England today the small car looks like a permanent factor in the industry, in fact, but a continuation of the industry, bringing it more and more into the zone of possibility of the great middle classes.

AT the opposite end of the gamut is the large car, the high-powered machine, that a year ago gave evidence of a little

loss in prestige. Today not a few of the builders of such large vehicles have dropped one or two of the larger models and are concentrating on the smaller ones. The war may have precipitated this condition, at any rate it remains a matter of record.

THE small motor, a few years ago looked upon with more or less uncertainty, cannot be so considered any longer. There are many cars with motors smaller than 2.5 inches bore, truly a small design, when we look back a few years to the time when a 4-inch bore was the low limit of a motor. The small motor has made progress during the past year; there are many examples of dropping from 70 millimeters to 60, and the question naturally is asked, Where will the end be? With smaller cylinders there has not been much lengthening of the bore-stroke ratio, but the smaller size is justified by the lighter weight, bodies being smaller, the four-passenger type being more popular than ever. There have been very general reductions in chassis weight, so that in the final analysis the smaller motors have little more work to do than the larger ones of this year.

CHASSIS are refined all along the line, in fact, it is an accepted fact that when you cut down your motor you also must keep in mind the reduction of weight as well as higher chassis efficiency. It is highly essential in these days of smaller motor that the chassis efficiency be raised. Universal joints have received attention, and the tubular propeller shaft is playing its part, brakes are more proof against dragging, tire efficiency is considered, reciprocating masses have come in for attention, in fact, there is a general program of efficiency so that the power of the new motor will not be lost by the defects of the chassis.

Motoring Nimrods Hunt Rabbits with Searchlights

Illinois Sportsmen Forced to Adopt New Tactics

BLOOMINGTON, Ill., Dec. 7—Barred from farm and timberland by the ever recurring "non trespass" signs, central Illinois hunters are restricted to the highways for their annual quest of game. Never before have land owners so effectually guarded their premises, nor have warning signs been so numerous. So limited is the sport that many nimrods are regarding their licenses as a joke, a case of securing money by the state under false pretenses.

About all that is left for the sportsman is the mild-appearing but fleet-footed rabbit. As it no longer is possible to trail the elusive bunny across the fields, hunters are forced to follow the country roads, a rather restricted area and apparently barren of results. It remained for a shrewd nimrod to utilize a motor car, carrying a pair of powerful searchlights, to seek the bunny by night. So successful has this method become that it frequently happens that as many as a score of cars leave Bloomington for a night raid upon the rabbit population of McLean county.

Sportsmen who in years gone by, have walked for miles through tangled corn fields, fought their way through thickets, or stumbled over fields of stubble in order to bag a few rabbits or quail, find the new system, far more inviting. The up-to-date hunter now lolls back in the cushions of a luxurious car, with a chauffeur to drive it and an operator to work the searchlights. On some cars, a post is set up upon the top of which is mounted the light.

The brilliant light has been found to be wonderfully effective in attracting the rabbits. They scamper to the road side by dozens and either squat down, blinking at the light, or hop up and down in bewilderment as if hypnotized. An easy mark is offered to the hunter and in a few hours a half-hundred can be killed. It is important to keep the light shining directly upon the prey for otherwise the dazing effect is lost and, in addition, the men with the guns are unable to see the game. It is imperative therefore that the spot light is movable and can be kept trained upon the little animal until the gun can be aimed.

Considerable skill with a gun is required to shoot from a moving car and possibly on a rough road. This adds to the attractiveness of the sport and central Illinois nimrods who have taken part in these motor hunting trips by night, are unanimous in declaring that it is the most alluring in their experience in the quest of game. In addition, it is about all the sport that is left for the Illinoisan.

HUYETTE AGAIN Q. M. C. PRESIDENT

Philadelphia, Pa., Dec. 5—The ninth annual election for officers of the Quaker City Motor Club, held in the Hotel Walton, resulted in the re-election to the presi-

dency of Paul B. Huyette. In addition to Mr. Huyette the following were the other successful candidates: Vice-president, G. Douglass Bartlett and A. H. Wetherill; treasurer, Ralph L. Murray, and secretary, W. E. Stagg; board of governors: L. Shoemaker, S. L. Gans, G. M. Graham, G. H. Gantert, R. D. Earle, G. E. Potts, F. Hardart, J. R. Overpeck and P. D. Folwell.

DISCUSS COAST ROUTES

Yuma, Ariz., Dec. 5.—At the recent meeting of the Ocean-to-Ocean Highway Association, held here, C. C. Barker of Banning, Ariz., was elected permanent president and

C. H. Coleman of Yuma permanent secretary. Delegates were present from California, Arizona and New Mexico, and in the addresses and discussions much interest was shown in the plans to construct a highway through California, Arizona and New Mexico to a connection with other transcontinental routes. It was decided at this meeting that for an all-the-year-around highway the only feasible route was via Yuma and Phoenix. John S. Mitchell made an extended address on the subject of constructing the proposed road, and pointed out the importance of immediate steps being taken to bring the project to a state of realization.

See America First — See America Now



EDITOR'S NOTE—This is the fourth of a series of illustrations and thumb-nail sketches of the scenic and historic wonders of America to be run in Motor Age with the idea of calling the attention of motorists to the picturesque points of interest in their own country.

NO. 4—BRADDOCK'S GRAVE ON THE EASTERN LINK OF THE OLD TRAILS HIGHWAY

Perhaps the most historic road in the United States is the eastern link of the National Old Trails highway. It joins Washington with Cumberland and is older than the American republic itself, being blazed through the forests by George Washington in 1752. Over this road marched the British troops and troop trains in the fatal expedition against Fort Duquesne in 1755. On this road the redcoats, fighting an ambushed foe and dying undismayed in the open, gave to the world an exhibition of gameness and pluck that is the Briton's heritage. In that road, so the story goes, Braddock, their commander, was buried after a French bullet had silenced forever the lips that would not give the merciful command, "Retreat." Braddock's body later was disinterred and removed to a point a few miles east of Uniontown, Pa., where his dust now lies underneath a cluster of solemn pines. The grave is unmarked and often is passed by the motorist unobserved because of its obscurity. The above illustration shows the location of Braddock's grave on the highway that bears his name.

Cross-Licensing Agreement Recommended by Chamber

Interchange of Patent Privileges Favored

NEW YORK, Dec. 5.—Yesterday at one of the most important meetings ever held by the National Automobile Chamber of Commerce, the members showed the united condition of the industry by recommending for general adoption by the industry a cross-licensing agreement which provides for makers to interchange licenses on patents which they own.

At the same session the members voted to take over the defense of the suit on rear axle patents brought by the Kardo Co. against the Studebaker Corp. in Chicago. It is stated that the members of the chamber will follow the same course in the event of any other similar suits being brought against companies belonging to the organization.

The chamber also appointed a committee at its session on Wednesday to co-operate with legislative or other authorities at Washington or elsewhere in supplying such material as will aid in a proper understanding of the needs of the business world. It was appreciated that legislative bodies have no desire to inflict hardships on any business and that supplying complete data of an educational nature to the investigators is certain to operate for the general good.

In regard to the recommendation for a cross-licensing agreement on patents, the thought was expressed that the industry has prospered by scientific manufacturing of a product of excellent quality, and that, while each company held some patents of great value, it would be better for the industry at large that each concern, while developing its own ideas and standards with the idea of building the best possible machines, should be free from attack on patents owned by the others. As General Manager Alfred Reeves of the chamber expressed it, the whole thing resolved itself down to the question whether one maker's patents are more important than the entire balance of the industry. An idea of the disastrous possibilities in the way of patent litigation which are possible may be gained from the fact that members of the chamber own between 900 and 1,000 patents, and that there are at least six or seven important patents on each part used in car construction. Naturally when the cross-licensing idea was proposed, there was an animated discussion, although this was all along the same lines.

Henry B. Joy, president of the Packard company, read a letter which he had addressed to E. R. Benson of the Studebaker Corp., which was more or less in explanation of the Kardo litigation against Studebaker, which litigation was the real cause of the meeting. The letter was largely a reply to a circular distributed among the chamber members and in which the statement had been made that the Kardo com-

pany really was organized to exact tribute by way of patent royalties from the industry.

Mr. Joy refuted this and stated that if ninety-three of the largest car manufacturers are to band themselves together for the purpose of ignoring the rights of inventors that inventors really should seek the patent courts. Mr. Joy referred to the meeting of the chamber on May 6, in which it outlined the policy of patent peace and referred to the present action as a complete change of direction in this matter. He said that the Kardo company soon after the May meeting sent to every member of the chamber a list of Packard patents with an expressed willingness to grant licenses under any and all of them under reasonable terms, and that the company was ready and willing at all times to accord others exactly the same recognition of their patents that he asked for those of his company.

The discussion of general trade showed that the industry, aided by the favorable weather conditions and returning business prosperity, has more than held its own, even during the fall months. Export trade has suffered considerable, so far as passenger cars are concerned, on account of the war, although this is offset to a large degree by the sale of motor trucks to foreign countries.

President Clifton presided over the meeting, at which were represented practically all the leading manufacturers.

GOODYEAR HOLDS ANNUAL MEETING

Akron, O., Dec. 9—Reports presented to stockholders at the annual meeting of the Goodyear Tire and Rubber Co., held here Monday, disclose that 1914 was the most successful and satisfactory in the company's history. The earnings for the year ended October 31 were equivalent to more than 36 per cent on common stock. The net income was \$3,391,000, out of which was paid 7 per cent dividend on the preferred stock and 12 per cent on the common stock.

In its balance sheet the company makes an excellent showing with current assets of \$11,039,000 against current liabilities of \$668,000. During the year the slate was cleaned of notes payable aggregating \$3,653,000. As usual, Goodyear carries its patents, trade marks and designs, or good will on its books at \$1 and all the figures on the asset side are real, tangible values. Cash on deposit and on hand has increased from \$1,141,000 in 1913 to \$2,862,000 in 1914, or more than 150 per cent.

The stockholders re-elected the directors, F. A. Seiberling, C. W. Seiberling, G. M. Stadelman, F. H. Adams, P. W. Litchfield, H. B. Manton and J. P. Loomis—and the officers of the company also were re-elected, as follows: F. A. Seiberling, president and

general manager; C. W. Seiberling, vice-president; G. M. Stadelman, secretary; F. H. Adams, treasurer; W. E. Palmer, assistant treasurer and P. W. Litchfield, factory manager.

GYROSCOPE MOTOR IN COURT

Detroit, Mich., Dec. 5.—A suit for alleged breach of contract ended in the circuit court yesterday in the awarding of \$46,106.75 to Julian G. Dickinson, receiver for the defunct Blomstrom Mfg. Co., against Fred Postal, owner of the Griswold hotel, Detroit, and against Henry Bowen, a business man of Saginaw, Mich.

The complaint of the receiver against Postal and Bowen was that they had agreed in 1909 to take over the assets of the Blomstrom concern and to form a new company to be known as the Lion Motor Car Co. All the gyroscope motors made by the Blomstrom company were to be taken over by the new concern, but it is charged that this was not done by the new company.

The stockholders of the Blomstrom company were to receive stock to the full value in the Lion company, it is said. After the incorporation of the Lion Motor Car Co., it is alleged that Postal and Bowen did not keep their contract.

HAWKINS CYCLECAR CO. QUILTS SUIT

Xenia, O., Dec. 5—The Hawkins Cyclecar Co., has filed in the common pleas court a dissolution suit, claiming that the purpose of the corporation had failed, in so much that it had been unable to sell a manufactured product. In compliance with the law, which requires that 3 months elapse between the time of the petitions and the hearing, the date of the trial was set for February 27. W. L. McAllister was appointed by the court as master petitioner, to hear complaints and receive claims against the company.

HORN ORDER VACATED

New York, Dec. 5.—The order extending the term of the court for all purposes of the suit of the Lovell-McConnell Mfg. Co. against the Automobile Supply Mfg. Co. for 6 months from the date of the final decree was vacated yesterday by a memorandum issued by Judge Veeder. It was brought out in the memorandum that, while an extension of the term was not required for the assertion of any rights remaining to the Lovell-McConnell company, the publicity given to the order had injuriously affected the Automobile Supply Mfg. Co. This suit now is at an end unless the Klaxon makers petition for a hearing before the supreme court of the United States.

The order in question was granted by

Judge Chatfield October 31 on motion of the Klaxon counsel following the confirmation by the circuit court of appeals of the decision of Judge Coxe handed down on June 8 in favor of the Automobile Supply Mfg. Co. The memorandum was issued in the United States district court for the eastern district of New York.

LOZIER ADMITS INSOLVENCY

Detroit, Mich., Dec. 9—Special telegram—At a meeting of the stockholders and board of directors of the Lozier Motor Co., objections to the bankruptcy proceedings against the concern were removed by the unanimous admission of willingness to be adjudged bankrupt. It had been previously denied that the company is insolvent.

The resolution passed by the stockholders was to the effect that although the assets of the company are in excess of all its liabilities, except for capital, nevertheless in view of the fact that a petition in bankruptcy has been filed against the company and as it has no cash to pay its obligations

and is not able to raise the necessary cash for that purpose, the officers were authorized and instructed to admit in writing the inability of the company to pay its debts and its willingness to be adjudged a bankrupt. It however denied that acts of bankruptcy have been committed when it stated in writing on November 16 its inability to meet its obligations. It is probable that the concern will be adjudicated a voluntary bankrupt by Judge Tuttle when the matter comes before him very shortly.

PALESTINE RECEIVER ASKED FOR

Lisbon, O., Dec. 5—Charging that the East Palestine Rubber Co. is on the verge of insolvency and in imminent danger of becoming wholly insolvent through mismanagement, A. E. Burnett has filed an action in the common pleas court here asking that a receiver be appointed by the court to protect and manage the property of the company. The company manufactures motor car tires.

Stewart Vacuum Feed Test by A.A.A.

Interesting Results in Indianapolis Trials

INDIANAPOLIS, Ind., Dec. 5.—An increase in efficiency of approximately 12 per cent by the use of the Stewart vacuum gasoline system as compared with a pressure feed system was shown in an official test with a Buick six, December 3 and 4, on the speedway and Indiana roads. The purpose of the test was to compare the economy of pressure feed with that of the Stewart vacuum feed.

The test was officially sanctioned by the American Automobile Association and was under the supervision of F. E. Edwards, technical representative of the contest board of the A. A. A. and Chester S. Ricker, technical representative of the Indianapolis motor speedway. The car used

was a Buick model C-55, with a six-cylinder $3\frac{3}{4}$ by 5 motor. The fuel used was Red Crown gasoline of 66.5 degrees Baume at 46 degrees Fahrenheit. The fuel was carried in a special air-tight tank located on the left running board, and adapted either to pressure feed or atmospheric pressure when attached to the Stewart vacuum feed system. The car weighed 4,940 pounds with five passengers.

Throughout the day the weather was very unfavorable for road tests, caused by an almost continual rain, which made the roads heavy. The temperature was fairly constant, varying from 42 to 44 degrees Fahrenheit. The wind blew steadily from the northeast during the highway trials, so

that it was necessary to run the trials in both an easterly and westerly direction in order to give an average performance.

Road trials started at Irvington, the easternmost part of Indianapolis, and the run was made to a point about 12 miles out in the country where the direction was reversed, so that the car could retrace the same road and finish somewhere near the point of start.

The speed of the car on the highway averaged 22 miles per hour and, on the speedway, 30 miles per hour. Five passengers were carried during the highway trials and two during the speedway trials. Conditions were made as nearly identical as possible for both pressure and vacuum system tests.

STUDEBAKER EXPECTS BIG PROFITS

New York, Dec. 7—Net profits of the Studebaker Corp. for 1914 will be more than twice as great as in 1913, according to information. On the basis of actual figures for the 9 months ending September 30, it is estimated the profits, after depreciation and interest charges will be about \$4,000,000, comparing with \$1,904,823 last year. Accordingly the surplus available for dividends on the common stock would be equal to 11 per cent on the \$27,931,600 stock outstanding. Since January 1 the company's serial notes outstanding have been reduced from \$6,800,000 to \$5,800,000. In addition to the \$800,000 that matured, the company cancelled \$200,000 bought in the open market.

NEW BATTERY COMPANY FORMED

Louisville, Ky., Dec. 4—The Revivo Storage Battery Co., with a capital of \$200,000, was organized here recently. The new company will manufacture a dry storage battery, designed to displace the acid battery for all classes, which it is said can be recharged indefinitely. R. M. Kelly, Jr., has been elected president of the Revivo company.



SCENE AT INDIANAPOLIS SPEEDWAY DURING STEWART TEST

Contest Board Sets 1915 Racing Dates

Tentative Speedways' Applications Tabled

NEW YORK, Dec. 4—At today's meeting of the contest board tentative dates for 1915 speed contests were allowed as follows:

Indianapolis speedway.....	May 29
Galesburg, Ill., 200 miles.....	June 16
Sioux City speedway.....	June 25
Tacoma road race.....	July 4
Elgin road races.....	August 20 and 21

Applications were made for dates from the recently organized Minneapolis speedway, also by the Sheephead Bay speedway promoters and the Detroit speedway, but owing to construction not having started on some of these no consideration was given the dates.

The official summary of sanctions issued by the contest board for the present year shows a total of 120 as compared with 101 last year, 132 in 1912, 117 in 1911, and 166 in 1910. In the last 5 years 1910 stood first in the contest field; 1912 was next, followed by 1914. The two poorest years were 1911 and 1913.

A further analysis of the 120 sanctions issued this year show that fifty-two were on $\frac{1}{2}$ -mile dirt tracks, thirty-six on 1-mile dirt tracks, ten were road races, eight reliability tests, two hill-climbs, four certified trials, and one each of beach races, commercial vehicle tests. Sanctions were issued to two speedways during the year, Indianapolis and Sioux City.

Another act of the contest board was to order the reinstatement on January 1 of William H. Pickens, Oldfield's former manager, who has been under suspension for 3 years.

Many records made on speedways and tracks for the year were allowed, these including Indianapolis speedway records up to 500 miles made on May 30. Oldfield in the Stutz gets two of these marks, namely 20 and 25 miles, and all of the others above this go to the foreign cars. Other records were granted including 15-miles, 20 miles, 25 miles, and 75 miles to Burman on 1-mile dirt tracks, and 100 miles to Alley on a dirt track.

The annual statement of the contest board showed total receipts of \$16,777.51, as against total expenses of \$10,688.10, leaving a surplus for the year of slightly over \$6,000. The receipts were from five sources, namely, sanction fees, drivers' registration fees, track licenses, fines and appeals. The sanction fees totaled \$13,640; the fees from the registration of drivers, \$2,257.

HAYNES IN LOW-GEAR RUN

New York, Dec. 5—A severe test of the ability of the Haynes small six to stand the continuous use of the low gear was made yesterday, when a demonstrating car was given an all day low-gear run by Clarence R. Schuyler, manager of the Haynes branch in Newark, N. J. The total distance was 180.4 miles, of which 166.1

miles were covered without stopping the motor. A stoppage in the fifteenth mile due to a clogged gasoline line was the only untoward incident of the trip.

The car was driven 100 miles, non-stop, in 6 hours 52 minutes and the distance for 10 hours running was 151.2 miles, a little better than 15 miles an hour. The consumption of gasoline for the whole 180.4 miles was 23 gallons or 7.8 miles to the gallon, and the oil used was 7 quarts or 25.7 miles per quart. No water was added to the cooling system and the car returned at the end of the run with the radiator practically as full as when starting out; the actual drop of the water level was less than $\frac{1}{4}$ inch. A Motometer showed that the temperature did not rise higher than 160 degrees Fahrenheit at any time; the average was about 115 degrees. The water did not boil at any time and the water jackets were not too hot to lay the bare hand on even at the tops of the worst of the many bad hills.

An observer rode with the driver all the way, checked all oil and gasoline, read the meters and, generally, saw that the run was made fairly. No gear was engaged ex-

cept the low and occasionally the reverse. On down grades the clutch was not disengaged, so that the car did no coasting whatever.

The route covered led through Morris-town, Hackettstown, Delaware Water Gap, Lake Hopatcong and back to Newark through Montclair and Bloomfield; the roads were mostly poor and in many places very bad; hills were numerous and some very trying.

The car was one that is used as a demonstrator and had been run about 1,000 miles. It was loaded with full equipment and four passengers and, weighed en route, scaled 3,800 pounds with and 3,230 pounds without passengers. The low-gear ratio is 11.75 to 1, intermediate 7 to 1 and high 4 to 1. After the run the car was throttled down in high until it kept pace for some distance with pedestrians on the sidewalks. At times during the run the speed was 20 miles an hour, the motor running smoothly and the Motometer showing but a few degrees higher temperature than when running at 12 or 15 miles an hour.

STREET CAR COMPANY COMPLAINS

Decatur, Ill., Dec. 7—M. L. Harry, general manager of the Decatur city railway system, announced in his annual report that receipts for the year declined 15 per cent over those of the preceding

RECORDS ALLOWED BY AMERICAN AUTOMOBILE ASSOCIATION

SPEEDWAY RECORDS, REGARDLESS OF CLASS

Distance, miles	Time	Driver	Car	Place	Date
20	13:58:14	Oldfield	Stutz	Indianapolis	May 30, 1914
25	17:30:40	Oldfield	Stutz	Indianapolis	May 30, 1914
50	33:45:32	Christiaens	Excelsior	Indianapolis	May 30, 1914
75	50:21:24	Christiaens	Excelsior	Indianapolis	May 30, 1914
100	1:10:46:50	Duray	Peugeot	Indianapolis	May 30, 1914
150	1:46:20:00	Duray	Peugeot	Indianapolis	May 30, 1914
200	2:25:11:00	Duray	Peugeot	Indianapolis	May 30, 1914
250	3:00:58:48	Thomas	Delage	Indianapolis	May 30, 1914
300	3:38:29:59	Thomas	Delage	Indianapolis	May 30, 1914
350	4:15:22:69	Boillot	Peugeot	Indianapolis	May 30, 1914
400	4:52:12:10	Thomas	Delage	Indianapolis	May 30, 1914
450	5:27:33:50	Thomas	Delage	Indianapolis	May 30, 1914
500	6:03:45:94	Thomas	Delage	Indianapolis	May 30, 1914

ONE MILE CIRCULAR DIRT TRACK RECORDS

15	12:47:00	Burman	Peugeot	Peoria, Ill.	Sept. 12, 1914
20	17:10:30	Burman	Peugeot	Springfield, Ill.	Sept. 19, 1914
25	21:37:30	Burman	Peugeot	Springfield, Ill.	Sept. 19, 1914
75	1:08:56:00	Burman	Peugeot	Galesburg, Ill.	Oct. 22, 1914
100	1:31:30:00	Alley	Duesenberg	Hamline, Minn.	Oct. 24, 1914

SUMMARY OF OFFICIAL SANCTIONS ISSUED BY A. A. A. CONTEST BOARD

	1910	1911	1912	1913	1914
$\frac{1}{2}$ -mile circular dirt tracks.....	16	13	35	24	52
$\frac{3}{4}$ -mile circular dirt tracks.....	2	1	1	3	2
1-mile circular dirt tracks.....	50	37	56	35	36
2-mile circular dirt tracks.....	1	1	2	2	..
2 $\frac{1}{2}$ -mile circular dirt tracks.....	1	1	..	..	..
4-mile circular dirt tracks.....	2	..	..	..	..
1-mile speedway, Los Angeles.....	3	3	1	..	..
1/2-mile speedway, Oakland, Cal.....	..	..	1	..	..
2-mile speedway, Atlanta.....	3	..	..	..	..
2 $\frac{1}{2}$ -mile speedway, Sioux City.....	..	..	..	..	2
2 $\frac{1}{2}$ -mile speedway, Indianapolis.....	5	1	1	1	1
3 $\frac{1}{2}$ -mile speedway, Denver.....	2	1	..	..	1
3 $\frac{1}{2}$ -mile speedway, Tacoma.....	..	..	..	..	1
24-hour track races.....	3	3	..	..	..
200-mile time trial.....	..	..	..	1	..
	88	60	97	66	94
Beach races	4	4	2	3	1
Road races	5	8	8	12	10
Hill climbs	20	14	6	5	2
Reliability, pleasure cars.....	45	24	17	14	8
Reliability, commercial vehicles.....	4	4	2	1	1
Non-stop tests .....	..	2	2	..	4
Certified trials .....	..	1	..	..	..
Record trials .....	..	..	..	..	..
	166	117	132	101	120

year. The loss is ascribed to the general use of motor cars. A large proportion of suburban residents, who formerly patronized the street cars, now own cars. The company not only loses the revenue from this class but it is customary for the drivers to pick up persons, not car owners, who are waiting to drop their nickles in the slot, either down town, or near their homes.

Standing at a street corner, waiting for the public conveyance are, maybe four or five persons. Along comes a motorist, driving a five or six-passenger car of which he is the sole occupant. Among the group he recognizes a friend and hails him with a cordial "jump in." His friend may have been conversing with the others, and, although they may be strangers to the driver, etiquette demands that he make the invitation general. In they all pile and, a moment later, a street car that otherwise would have picked up five fares, rolls by without stopping.

If one looks carefully, he will see this repeated time and again, almost every hour of the day along the street railway lines of the city. If only 100 such patrons were lost daily, it would mean a loss of \$5, or \$1,750 per annum. The chances are, however, that the number is nearer 200 than 100. Add this loss to the hundreds of owners who formerly were patrons of the street cars and it will be realized that the companies are certain to be heavy losers.

CORONA AVERAGES REVISED

Los Angeles, Cal., Dec. 5—A revision of the times made in the recent Corona road race, won by Pullen in a Mercer, shows several discrepancies in the miles per hour column at intermediate distances. Herewith are presented the new figures for each ten laps:

Leading car	Miles	Time	M.P.H.
No. 4 Mercer	27.7	18:10	91.48
No. 18 Sunbeam	55.4	37:00	89.84
No. 18 Sunbeam	83.1	55:20	90.11
No. 18 Sunbeam	110.8	1:13:35	90.27
No. 18 Sunbeam	138.5	1:31:49	90.51
No. 8 Stutz	166.2	1:54:31	87.08
No. 8 Stutz	193.9	2:12:34	87.76
No. 4 Mercer	221.6	2:31:38	87.69
No. 4 Mercer	249.3	2:51:53	87.02
No. 4 Mercer	277.0	3:08:55	87.98
No. 4 Mercer	301.81	3:26:02	87.89

DE PALMA ENTERS INDIANAPOLIS

Indianapolis, Dec. 12—Ralph de Palma, America's road racing champion, with his grand prix Mercedes has entered the 500-mile race. Through his backer, E. C. Patterson, de Palma made entry this week, desiring to be as close to the head of the list as possible, because of the Hoosier elimination trials, which take place in the inverse order of nomination each year.

CANADIANS AFTER ARMY TRUCKS

Ottawa, Ont., Dec. 4—Two hundred motor trucks will be ordered for the Canadian forces at an approximate cost of half a million dollars. The probability is that the parts will be purchased in the United States and the assembling done in the seven principal motor car factories of Canada.

San Diego Placed on Racing Calendar

California Road Race Set for January 9

LOS ANGELOS, Cal., Dec. 3—The entry blanks for the San Diego exposition road race which is scheduled for January 9, were distributed today. The event is to be conducted under the auspices of the Al Bahr Temple, Mystic Shrine, San Diego, under official A. A. A. sanction No. 786. The event is to be managed by A. M. Young, of this city, who handled the recent Corona road race.

The San Diego event is to be run over the spectacular Point Loma course, which measures 5.982 miles to the circuit. The total distance for the race is 305.082 miles or fifty-one laps. There is to be but one event, the class D non-stock free-for-all. The entry fee is \$150 and \$10,000 in cash prizes is to be awarded, with an additional \$2,500 for a new world's record for a distance not less than 300 miles.

While no entries have been officially announced, the management stated today that it was practically assured that all the drivers who appeared at the Corona speed meet, would drive at San Diego and later go north to compete in the Vanderbilt and grand prix at San Francisco in February.

Earl Cooper left for the east yesterday in company with Fred J. Wagner, but is to return in time for the San Diego meet. Bob Burman is in Los Angeles, but Ed. Rickenbacher has gone to New York for parts for the Peugeot cars which were disabled at Corona.

Harry Grant and Harry Babcock with the two Sunbeams are repairing the machine which was wrecked by fire in the Corona race and Grant stated today that he believed the car would be ready for the San Diego race.

The Duesenberg team is still here and will enter the next California race.

Barney Oldfield is reported to be signed to drive a Maxwell at San Diego but the veteran driver says that he will not know what car he will drive or if he will drive at San Diego at all or not, until the practice starts on the Point Loma course, January 2, the day after the exposition opens.

Eddie Pullen went north to look over the San Francisco course today and said it was probable that he would pilot the Mercer at San Diego, although there was nothing certain.

The Stutz trio is to be in the race and the entries are to be filed early next week, according to the race management.

Ralph de Palma has returned to the east but is to be back for the San Diego event according to close friends here.

A 50-mile match race on the local Ascot Park 1-mile dirt track between Barney Oldfield and Earl Cooper has been scheduled for January 20. The race grew out of a feeling of jealousy which has existed between the two drivers for some time, so it is claimed, and Oldfield accepted the defi of

Cooper which was wired back to this city from Cooper who now is on his way to New York.

A 10-mile motor race course around Perris hill, just north of San Bernardino, is being seriously considered by San Bernardino capitalists and motor enthusiasts. The project has been placed before the local chamber of commerce and the board of supervisors and it is probable that construction will be commenced within a short time.

The proposition is being backed by Charles Rouse and John Anderson, of this city. Both men are influential in this section on account of their extensive operations as capitalists.

BAY STATE COUNTS RECEIPTS

Boston, Mass., Dec. 5—The fiscal year for the Massachusetts highway commission, which controls motor cars in the Bay state, ended November 30, and the figures just compiled show that motorists contributed a large amount of money to the state this year. The grand total reaches \$965,669.59. That it did not go up closer to the million mark is due to the fact that the motorists showed greater respect for the law, and so, while the total number of cars and drivers increased a great deal, the fines this year were slightly more than in 1913.

The fact that the increase in drivers was about 22 per cent and the increase in cars 23 per cent and the fines were nearly the same as a year ago is good evidence that motorists are getting away from the speed mania. The total amount for fees was \$925,964.75, while in 1913 it was \$803,196.51. The fines in 1913 totaled \$39,043 and this year they reached \$39,704.84. When the expenses of running the highway commission are deducted Massachusetts will have more than \$800,000 for road maintenance, of which \$640,000 will be available for state roads and \$160,000 for improving through routes under city or town control.

The registrations for the year totaled 77,246 motor vehicles. These figures include 8,236 commercial vehicles and thirty-nine cars owned by non-residents. A year ago there were 62,660 vehicles, which included 5,948 trucks and 920 non-residents. The general increase was 23 per cent for all vehicles and about 40 per cent for commercial vehicles. The larger part of the cars registered were less than 30 horsepower and came under the \$10 classification. As a matter of fact, including the electrics and the trucks registered at \$5, the number of vehicles paying \$10 or less totaled 60,103 out of the 77,246.

There was a gain of 180 in the manufacturers and dealers' class. There are now 99,532 persons licensed to operate cars in Massachusetts, or about one in every 33. This is a gain of 18,488.

Control of Pedestrians Called Safety-First Necessity

F. H. Elliott Outlines Results of His Long Trip



A SAFETY-FIRST EXPERIMENT IN PHILADELPHIA. BROAD AND CHESTNUT STREET LOOKING SOUTH. EAST-BOUND TRAFFIC IS WAITING TO GO EAST IN CHESTNUT STREET, A ONE-WAY THOROUGHFARE

DAMOCLES reclined on an easy couch, back in the days of old Syracuse, with a spear-like sword hanging heavy over his head and suspended by a hair.

The historians tell nothing of the deeds of Damocles, probably because he spent most of his time figuring the weight of that sword, the heft of that hair, the speed and acceleration of a falling weight and the resistance to penetration of a human hide. To him gravity meant gravity.

But Damocles today—rushed down through the centuries to A. D. 1914—stationed observingly at some busy angle of Broadway or State street or Market street or Woodward avenue or Tremont street or Grand avenue—

Would Damocles, after glimpsing the swirling tangle of wheels and feet, the thousand and one signs hanging precariously over side-walks and the listless men and women and children who cross streets in the middle of blocks side-stepping this way and that as if playing hop-scotch, just escaping by a hair's-breadth several of the whizzing streams of mechanical vehicles—Would Damocles gasp spasmodically at this sight and plead for the security of his couch and pendant sword?

* * *

FREDERICK H. ELLIOTT, general secretary of the Safety First Society of Greater New York, is one man in this world who is devoting all of his time to the safeguarding of us mortals against the chances of harm and ruin—and, incidentally, to making life more attractive for Damocles should he return.

Mr. Elliott has just returned to New York from a 9 weeks' motor tour through

seventeen states, covering a period of 9 weeks and a distance of 3,800 miles, in which he addressed scheduled meetings in seventy cities all in the interest of public safety.

The plan of Mr. Elliott's in making this tour was to observe at first hand the problems of other cities, insofar as they concern the freeing from danger of citizens' lives and limbs, and determine if the lessons learned are applicable to the more dangerous situation in Manhattan.

At the outset of the trip Mr. Elliott was convinced that the fault for most of our accidents lies in the pedestrian and not in the motorist or railroad company.

Regulate the Pedestrians

"I am convinced now that all traffic regulations for the present should involve pedestrians mainly," Mr. Elliott said to a representative of Motor Age, "and that police should have stringent control of walkers as they have, in some places, of vehicles.

"Nearly all of the states have been busy since the development of the motor car promulgating ordinances and statutes in restriction of motoring. Nothing has been done to govern the walkers on the streets and there is no question that the time has come when this must be attended to."

A further observation of great importance by Mr. Elliott is that motor cars and all other vehicles not common carriers should be controlled in each state by a department separate from the office of the secretary of state or the highway commission, to be known as the department of traffic and vehicles. Said Mr. Elliott:

"I found a most excellent plan in the state of New Jersey, where Governor

Fielder has appointed a traffic commission consisting of J. H. Lippincott, commissioner of motor vehicles, chairman; A. V. Hamburg, president Newark board of trade, and George B. LaBarre, director of public safety of Trenton. This commission will compile a report with the legislature of that state in which will be incorporated some proposed radical reforms in regard to the control and jurisdiction over vehicular traffic and pedestrians. Owing to the great increase in the use of motor cars, especially motor trucks, it is the consensus of opinion of public officers and citizens who are versed upon the subject that all vehicular traffic on the public streets and highways, the control of pedestrians at street intersections, the regulation of motor vehicles, the examination and licensing of all operators of motor vehicles, with the power to suspend or revoke such licenses, should be vested in a new state department to be under the direction of a commissioner of traffic and vehicles, this commissioner to be appointed by the governor, with the power to appoint deputies and designate branch offices in the important cities. This commissioner also to coöperate with similar commissioners of other states for the purpose of standardizing the traffic regulations in the various municipalities, except those which are entirely local in their application, as, for example, the designation of one-way traffic streets, special traffic regulations, which are made necessary owing to physical conditions of purely a local nature.

"A commissioner of motor vehicles has no authority over plumbers' wagons that use streets at night, these wagons carry-

ing no lanterns and having projections of pipe over their tail board. These commissioners cannot control the lighting of motorcycles or stop the exhaust or cutout nuisance of motorcycles. They cannot take steps against wagons that litter up the road with over-running contents.

"All that these commissioners can regulate is the motorist, and, you can make sure the motorist is so thoroughly and completely restricted that you sometimes can hardly blame him for taking a flyer just to ease his soul."

Every meeting at which Mr. Elliott spoke was largely attended. These meetings were organized several weeks in advance by commercial clubs, motor clubs and other civic organizations and in some cases invitations were issued.

At Mr. Elliott's suggestion the commissioners and chiefs of police in all of the cities were given special invitations. "It is my belief that the police should be given power, and sole power, to govern traffic in the cities," said Mr. Elliott.

From his observations in Detroit, where the police are given unbridled authority to manage the city's traffic, Mr. Elliott is urging that such authority be so vested in other cities, even to the spending of money for experiments and testing devices for more promptly and efficiently handling traffic.

"I found that nearly all of the cities have their treasury doors clamped tight shut. Without exception there is earnest safety-first enthusiasm everywhere. Yet Detroit is the only town that is spending any money on safety-first experiments and this is due to the fact that the appropriation there has only to be 'O. K.'d' by John Gillespie, police commissioner," he said.

Following Detroit's Example

The "tennis court traffic lines" that are chalked all over Detroit have been watched by other cities, according to Mr. Elliott, and the adoption of the scheme is sure to follow in many cities now that Detroit has borne the expense of experimentation. This system provides white marks on the streets showing where pedestrians are to cross, where vehicles are to stand, and where the safety zone is for

street car passengers. The system also provides for parking cars at an angle on certain popular streets.

Another important observation of Mr. Elliott is that 50 per cent of the grade crossing accidents involving motor cars are caused by the stalling of the motor.

Safeguarding Grade Crossings

He learned this in Chicago, where the public safety commission and Coroner Peter Hoffman, of Cook County, found, upon investigation, that the stalling of motor car engines on grade crossings is due to the rough condition of the approaches to the tracks and the uneven planking between the rails, thus prohibiting the crossing of the tracks at a fair rate of speed. Said Mr. Elliott:

"Through the efforts of the public safety commission, the co-operation was secured of the railroad, state and county highway officials, and special trains were placed at

their disposal for examining the crossings, where accidents have been most frequent. The approaches of the railroad crossings were made smooth and the planks between the rails laid evenly, so that motorists could cross the tracks without materially reducing speed and thereby eliminating the possibility of stalling motors.

"Coroner Hoffman told me that he expected as a result of the improved conditions there would be a decrease of 75 per cent in the number of grade-crossing accidents during the present year. I contend that if similar improvements were made at the dangerous grade-crossings in the vicinity of Greater New York, many accidents could be prevented, this being particularly true throughout Long Island.

"In several cities the officials are planning to secure regulations eliminating the steps on the rear of ice wagons and other vehicles, making it compulsory to equip horse-drawn wagons used for delivery purposes with brakes, requiring that the attendants of filling stations should not fill gasoline tanks of motor cars unless the motor has been stopped and, at night, the lights thrown off and no one is permitted to light matches or smoke within a given distance of the filling stations.

"In many cities visited, the police authorities are making a semi-annual traffic census, so as to ascertain by comparative tables the ratio of increase in street traffic at congested intersections. In Detroit, a traffic census was taken on September 24, between the hours of 5 and 6 p. m., at Woodward and Michigan avenues, during which it was ascertained that 8,426 pedestrians, 670 motor cars, 39 horse-drawn vehicles and 500 street cars passed that point within the period of 1 hours."

Organizing for Safety First

As a result of the safety-first tour, organizations similar to the Safety First Society of Greater New York have recently been formed or are in the process of organization in many important cities throughout the eastern and middle western states. Under the leadership of the board of commerce of Detroit, the Safety First Society of Greater Detroit has been organized. Chicago and Milwaukee each has a public safety commission. St. Louis has a Safety First Society. The Toledo Commerce Club of Toledo has formed a safety first committee. The Indianapolis chamber of commerce has taken similar steps. Washington, D. C., has the Washington Safety Association. The Boston chamber of commerce has organized a safety first committee.

There has recently been organized the Philadelphia street safety commission. In Providence, R. I., Harrisburg, Pa., and Trenton, N. J., the local chamber of commerce is engaged in planning similar campaigns and the present indications point to the organization of at least fifty similar bodies in the more important cities throughout the eastern section of the United States within the next 2 months.



MR. ELLIOTT DISTRIBUTED THESE CARDS EN ROUTE



SECRETARY ELLIOTT IN HIS JEFFERY SAFETY-FIRST CAR

The Readers' Clearing House

SAYS CARS ARE NEEDLESSLY HEAVY

Commends Article by W. B. Stout—Asks for Arguments in Favor of Weight

MOLINE, Ill.—Editor Motor Age—I wish to commend Mr. Stout's article in your November 26th issue as the most plausible and best scientific explanation I have seen of the relation between spring action on one side and weight, tread and wheelbase on the other. I have long ago come to the conclusion that many, if not most, of our American cars are needlessly heavy. I drive a 30-horsepower runabout, weighing 2,600 pounds. The original springs were too light and the factory itself replaced them with stronger ones. Yet, when it comes to a question of easy riding, I have often been struck by the fact that I did not feel the bumps or the rebound of the car passing over an obstacle half as much in a Ford, for instance, as in my own heavier, longer and well-sprung car. The reason why has become a good deal clearer to me.

Very often I have commented to agents on the fact that their cars were so heavy. The explanation was always the same, "Well, you've got to have enough weight for the power that is in the car." It is a fallacy that ought to be exploded, at least in the average 30 or 40-horsepower vehicle.

The motor always is the heaviest single item of weight in a motor car. The majority, I dare say, of motors today are less than 4 inches bore. There is no reason why so many of the cars equipped with them should tip the scale at quite a little over 3,000 pounds, even with the added electric equipment and the longer stroke. Our manufacturers have overcome many a knotty problem in motor car building. Is it not time to give their attention to this point of weight very seriously? Reducing it is bound to make for easier riding and better efficiency all around, as the engine now is dragging a good deal of dead weight.

If any motor car engineer has an explanation to offer in favor of the present heavy weight, let him be heard.—J. B. Auleman.

Cannot Solder Brass to Aluminum

Bascom, Fla.—Editor Motor Age—How may brass be soldered to aluminum?

2—Kindly explain how oxygen gas generators are made, using range boilers.

3—Has a transformer a low and high-tension winding?—A. N. Bevis.

1—Brass cannot be soldered to aluminum.

2—The boilers are used not to generate the oxygen but to store it. The generator usually is a small apparatus in which the chemicals are heated, the oxygen given off being transferred to a tank from which

it is taken for use in removing carbon, etc. If you wish information on oxygen carbon removers write to the following makers, whose names appear in the Automobile Trade Directory: Prest-O-Lite Co., Indianapolis, Ind., Dyer Apparatus Co., Boston, Mass., Cox Brass Mfg. Co., Albany, N. Y.

3—All transformer coils have two windings.

GRINDING VALVES IN BUICK 37

Work Easily Done—Advantages of Different Axle Types

HAMILTON, O.—Editor Motor Age—The article in Motor Age of November 12, page 36, answering questions asked by an El Paso, Tex., motorist does not do the Buick B-37 justice. I have gotten as high as 24 miles from a gallon of 12-cent gasoline, but usually average around 20 and 21 miles. As to speed, I have shown 60 miles per hour on high and 46 miles per hour on second with a gear ratio of 4 to 1.

1—Kindly describe a method of grinding valves on a B-37 Buick. There are no slots in the valves, so as to turn them on the seats.

2—Where may an ammeter be connected so as to show how the battery is charging and the strength of the charge?

3—Outline the merits of the semi-floating, three-quarter floating and floating axles, and the advantage of each type over the other two, if any.—H. N. Swain.

1—The valves of the motor of the Buick B-37 are ground very easily. The entire valve cage is removed and the spring, spring seat, pin, etc., also, leaving only the valve and the cage. The valve with its cage is cleaned as best is possible, with a cloth and then grinding compound placed on the valve face. The valve then is placed into position. Holding the cage with one hand and by means of a nail or similar object in the hole in the bottom of the valve stem, turn the valve on its seat, using the right hand. This is illustrated in Fig. 1.

2—The method of installing an ammeter was described and illustrated in the December 3 issue of Motor Age, in this department.

3—In the floating axle the weight of the car is carried on the axle housing and hence the axle shafts are relieved of weight. The shaft in this type of axle may be removed without disturbing the wheels. The outer ends of the axle shafts are relieved also of bending stresses. The shafts take only torsional stresses in a floating type axle. In the semi-floating axle not only must the shafts turn the wheels but they must take direct load as well. The shafts cannot be removed unless the wheels are taken off.

The three-quarters floating axle is exactly like the floating except in the method of attachment at the wheel end. In the floating this is a flexible joint, while in the three-quarters the shafts are attached rigidly. The latter type of axle has the advantages of the floating but a disadvantage in that the shafts are sub-



Fig. 1—How the valves of the Buick model B-37 may be ground. This is a very easy method of doing the work

jected to additional end stresses due to side slipping, etc.

Data on Unconventional Piston Rings

EXETER, NEB.—Editor Motor Age—Kindly give the advantages of Leak-Proof piston rings and others of this type.

2—Describe the thin steel piston rings used in the Oldsmobile six, and other cars. What are their advantages?—C. C. Smith.

1—The Leak-Proof piston ring has the advantage that the name indicates, namely, it prevents the leakage of mixture and oil past the piston.

2—These rings, instead of being of one piece, are composed of a number, either two, three or four of narrower rings. Such rings, when inserted in a cylinder, soon lap themselves perfectly and form a good joint, preventing the leakage of mixture. The chances of leakage are reduced considerably in three-part rings because of the more complicated path necessary for the gases to traverse.

FOREIGN CAR AGENTS IN AMERICA

Names of Cars Represented in This Country—Regal Uses Stewart Carburetor

ROCKHAM, S. D.—Editor Motor Age—What carburetor does the Regal use for 1915?

2—Are there any high-wheel passenger cars being built at the present time?

3—Is the Michigan magneto still being manufactured?

4—How many different types of Kingston and Holley carburetors are there?

5—What foreign makers have agencies in the United States?

6—Which of the following cars are being manufactured: R. C. H., Nyberg, G. J. G., A. B. C., McIntyre, White steamer, Stanley steamer, Pope-Hartford, Staver, Benham, Elmore, Columbia Knight, Atlas-Knight, Henderson, Little, Star, Lozier, and Stoddard Dayton?—W. Andrews.

1—The 1915 Regal is equipped with a Stewart carburetor.

2—Motor Age knows of none.

3—The Michigan Magneto Co. was

adjudged bankrupt and the assets sold to Louis Dusoff, Detroit, Mich.

4—The Holley catalogue shows four types, one for single, two, three and four-cylinder motors, one for sixes, one for motorcycles and a special type for Ford cars. The Byrne Kingston company also is marketing four types.

5—The following cars are represented in New York City: Benz, Fiat, Mercedes, Peugeot, Daimler, Zedel, Clement, Renault, Darracq, Charron, De Dion, Isotta, Minerva, Delauney-Bellville, Metallurgique, Lancin, Panhard, Napier, Itala and Hotchkiss. Chicago also has agencies for the Peugeot, Isotta, Fiat and Berliet.

6—The R. C. H., McIntyre, Stanley steamer and Atlas, under the name of the Lyons-Knight, still are being made. The Lozier company at present is fighting an insolvency charge, so it cannot be stated the concern is out of business. It is expected the company will be reorganized.

TIMING VALVES ON A CHALMERS Magneto and Commutator Setting on 1910 Model—Differential Adjustment

Memphis, Tenn.—Editor Motor Age—Kindly answer the following questions regarding a 1910 Chalmers:

1—How to time valves and magneto.

2—How to adjust the differential.

3—How to eliminate the sliding of only one tire when foot or shaft brake is applied.—C. Hunter.

1—In timing the valves proceed as follows: Remove the plug in the top of the flywheel casing through which you may see certain markings on the flywheel rim. Have someone turn over the engine with the hand crank while you watch the flywheel and valve tappets. When the exhaust valve of No. 1 cylinder just closes, the mark Ex Cl on the flywheel should be across the center of the hole on top of the flywheel case. Should this mark not be in the center of the hole, turn the flywheel until it is, and then adjust the exhaust valve tappet of No. 1 cylinder until the tappet may be turned around freely. Then turn the flywheel 9/32 inch in the same direction and the mark In. Op. will appear in the center of the hole in the flywheel case. At this point the inlet valve should just start to open and if it does not, then adjust the valve tappet so that it does. Then continue rotating the flywheel until the next mark appears, which will be for the second cylinder and repeat the operations mentioned, and so on for the third and fourth cylinders.

The ignition timing requires setting of

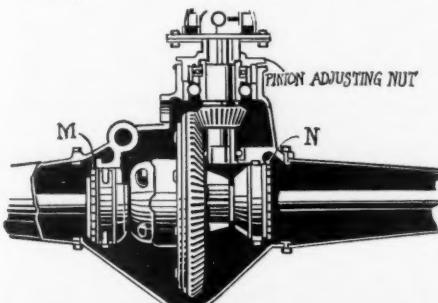


Fig. 2—Rear axle of the 1910 Chalmers showing the adjustments

both the battery commutator and magneto. In timing the battery spark turn the motor over until No. 1 cylinder is on top dead center. Then turn the switch on the dash coil to battery position. Raise the spark lever until the coil vibrates, which should occur when the lever reaches the point marked 0 on the quadrant. If the coil does not vibrate at this point disconnect the rod running from the commutator to the dash and adjust this rod by means of the threaded portion until the coil vibrates. While this adjustment is being made do not move the spark lever from the point marked 0. You should, of course, have the vibrators in the four dash coils adjusted properly.

In setting the magneto proceed as follows: Crank the motor until piston No. 1 is on top dead center. This point is reached when the mark, DC1 and 4, is in the center of the hole in the top of the flywheel case. The motor now is in condition to receive the magneto, provided the latter is properly set. Remove the magneto distributor cover and turn the armature of the magneto around until the distributor arm is on segment No. 1. Retard the breaker box and remove the cover. At the same time turn the shaft until the breaker points are just about to separate. The arm may be at the beginning, at the end or in the middle of the segment when the points are about to separate. Then with the points about to separate and the arm on No. 1 segment the magneto may be slipped in place and connected by means of the universal coupling.

2—The adjustment of the differential requires more than ordinary skill and should not be attempted unless you are thoroughly familiar with the work. The rear axle of the Chalmers is shown in Fig. 2, and the driving gears may be adjusted either by shifting the large ring gear, or the driving pinion. If there is too much play between the two gears then it is evident they must be brought together a little more. To do this, loosen the adjusting nut N and the one M on the opposite side of the differential. These are held in position by set screws. After these have been removed the adjusting nuts may be turned, perhaps blows from a light, soft hammer being necessary. Turn the nut N back about two turns and turn the nut M in the same direction the same amount. This action shifts the differential to the right and brings the ring gear in closer mesh with the driving pinion. Aside from this method the driving pinion adjusting nut, shown in the illustration, may be turned inward one or two turns. Lock all nuts which have been moved.

While Motor Age gives the method of adjusting the differential it should not be attempted unless you know by sound whether the unit is set properly. Even the well-trained men at motor car factories make errors in deciding on differential adjustments and you should not take it upon yourself to do this work without knowing the sound of a well-adjusted rear end.

3—You cannot prevent it unless you apply the rear wheel brakes so they will hold.

HORSEPOWER OF TWO MOTORS Size Is Not the Only Factor—Actual Test for Accurate Results

Chester, Mont.—Editor Motor Age—What is the actual horsepower of a four-cylinder motor $3\frac{1}{2}$ by $4\frac{1}{2}$ also $3\frac{1}{2}$ by 4? Which motor has the most pulling power and most speed?

2—Has a motor with overhead valves any more power than a motor with valves at the side?—C. P. Logan.

1—The actual horsepower of these motors cannot be ascertained without placing each on a test stand. The size of an engine does not determine its speed nor its pulling power. There are many other things to consider besides size. Valve location and timing, ignition timing, crank-shaft design, etc., are factors.

However, there is in use a horsepower formula called the S. A. E. or old A. L. A. M., by means of which the horsepower of an engine at 1,000 feet per minute piston speed is obtainable. This formula, however, considers only motor dimensions, and for the average motor gives fairly accurate results. It is expressed D^2N divided by 2.5 where D is the bore of the motor in inches and N the number of cylinders. You can get further information on horsepower ratings by reading the answer to A Reader on page 29 of last week's Motor age.

2—Read the answer to Neff Bros. in the November 26 issue on page 37.

Suggested Two-Color Dash Light

Worthington, Minn.—If the front glass of the dash lights were half green or blue would it not assist approaching motorists when lights are dimmed, when running or at curb?—H. E. Lamb.

It does not appear that the colored dash lights would assist any more than the regular clear-glass type. In most cities the use of any other than clear-glass in the dash lights has been prohibited.

Oil Won't Do for the Radiator

Chicago—Editor Motor Age—What objections would there be to using a light grade of lubricating oil in the radiator for cooling instead of water during the winter months? This would rot the rubber connections, but could this not be overcome by shellacking the inside of the hose with several coats?—W. B. Yost.

The use of lubricating oil will allow the cylinder metal to become hot. The oil is not as good a heat conductor as water or the water mixtures usually recommended. Shellac will not help much in protecting the hose, as in a short while it may loosen. The use of lubricating oil in the radiator will add weight to the car, and the gases given off after the oil has become hot are injurious. See page 3 of the October 22 issue of Motor Age.

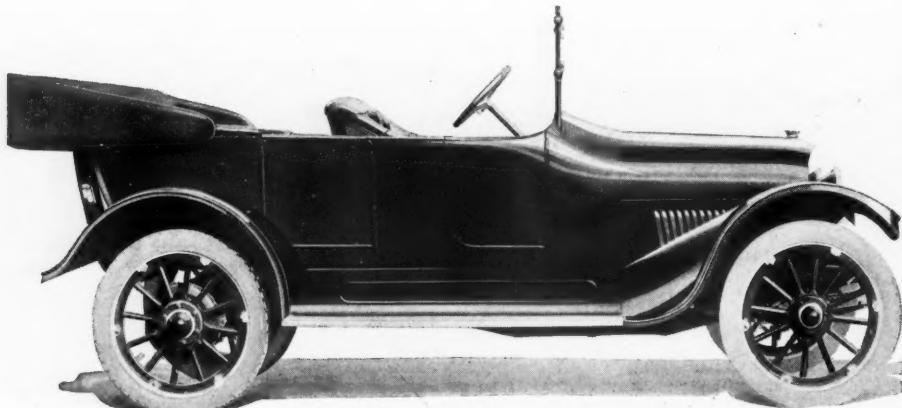
Questions Answered and Communications Received

J. B. Auleman.....	Moline, Ill.
A. N. Bevis.....	Bascom, Fla.
H. N. Swain.....	Hamilton, O.
C. C. Smith.....	Exeter, Neb.
W. Andrews.....	Rockham, S. D.
C. Hunter.....	Memphis, Tenn.
H. E. Lamb.....	Worthington, Minn.
W. B. Yost.....	Chicago
C. P. Logan.....	Chester, Mont.

No communication not signed with the reader's full name and address will be answered.

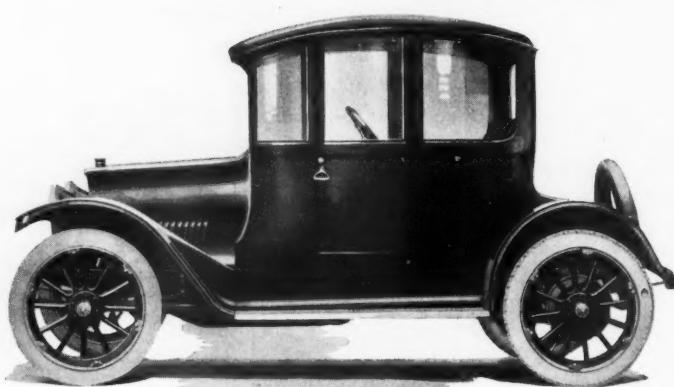
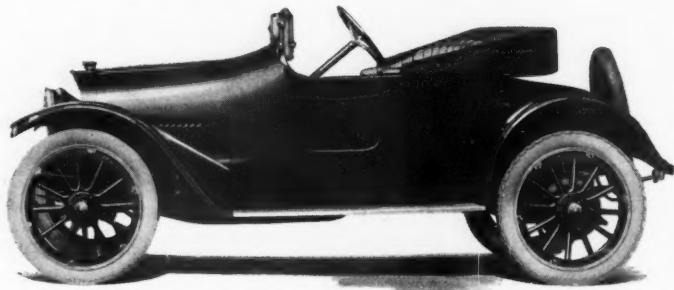
Reo Six at \$1,385 Selling Mate to Improved Four at \$1,050

Latter Reduced from \$1,175—Fundamental Design Alike in Both Cars



Six-cylinder Reo just announced by the Lansing concern. This car sells for \$1,385 and its general chassis design differs little from the four-cylinder model. The wheelbase is 122 inches

After four years of concentration on a single chassis—a four, the Reo Motor Car Co., Lansing, Mich., has started on the production of a six-cylinder car as a selling mate to its four, the price of the new job being \$1,385, the wheelbase 122 inches and such features as cantilever rear springs, spiral-bevel axle gears, overhead valve, 3 9/16 by 5 1/8 motor, etc., employed. Many of the running gear units such as clutch and gearset show design quite similar to that used in the four. But, while the six will share production honors with the four, the latter will by no means fall to the background. Its price has been reduced from \$1,175 to \$1,050 in five-passenger form, from \$1,175 to \$1,000 in two-passenger and \$1,650 to \$1,575 in coupe form, and, even with this price reduction, the car has received a number of noteworthy changes, the principal one being a lengthening of the wheelbase from 112 to 115 inches on the five-passenger only. The roadster and coupe still are 112. The main units, such as motor, gearset, clutch and rear axle have been practically unchanged, but the body and equipment have been altered, the former now being a better-appearing unit 4 inches deeper than on the old model and fitted with a new one-man top. The depth increase in the body has been possible because of the wheelbase increase, this change having resulted in a more roomy car. Another change, which has been affected because of the wheelbase alteration, is the changing of the rear doors to U-shaped members. In the old model the lower right corner of the door was cut off because the fender interfered



Four-cylinder roadster which has been reduced in price from \$1,175 to \$1,000 is shown at the top and the Reo coupe, which now sells for \$1,575 and formerly at \$1,650, is shown below

FEATURES OF THE 1915 REO LINE

New six has 3 9/16 by 5 1/8 motor

Intake in head, exhaust at side
Spiral-bevel rear axle gears

Wheelbase 122 inches

Cantilever rear springs

Remy cranking and lighting

General design like the four

Four wheelbase now 115 inches

New one-man top fitted

New hub caps

Body improved somewhat

with obtaining a perfect U, but now since the wheelbase is longer the fenders have been pushed back slightly and the door given a better appearance. The whole general outline of the car has been made more symmetrical by increasing the length of the curve from windshield to radiator. The hub caps on the new four are new and have the feature that they are removable with a screwdriver instead of a special wrench which, should it become lost, makes cap removal a difficult job.

Cars Alike Externally

The Reo six externally is like the four. The body, like many of the present stream-line affairs, shows a series of curves with no corners at the hood line or front fenders.

The three units—motor, gearset and rear axle—are separate, which is in line with the ideas of the design used in the four, to obtain accessibility of every part.

The motor is what may be called a semi-overhead valve, and shows the general features of the four motor, the intake valves being in the head and the exhaust at the side, calling for cylinders of an L-shape. One of the outstanding features of the Reo six motor is its cleanliness, obtained by complete inclosure of all the mechanism in the head. This is accomplished by the use of a suitable two-part cover, clamped in place.

Cylinders are cast in threes and on the left side is the carburetor, an unwaterjacketed Johnson, 1 1/4-inch size, the water pump and the exposed steering mechanism. This carburetor is fed by gravity from a 17-gallon tank under the front seat, and is heated by hot air taken from around the exhaust pipe and passed be-

tween the cylinder blocks through suitable tubing. This carburetor feeds to the integral cored-out cylinder head by a two-arm manifold, the mixing chamber feeding it being hot-water jacketed. The water pump is driven from the front end gears, which are helically cut, and forces the water through a brass pipe to openings, one in each block of cylinders.

The right as well as the left side of the motor is exceptionally clean. Here is found a Remy combination generator and distributor supplying current both for the lights and ignition. This unit is driven from the front end gears and is very accessible, most of it showing above the frame line. The ignition wires leave the distribu-

ter and run through a conduit between the cylinder blocks to another carrier on the left side of the motor and under the head covers. This makes a rather neat arrangement and protects the wires from all injury due to heat, etc. The generator distributor system is assisted by battery ignition for cranking purposes.

The exhaust manifold is of peculiar shape, widening out as it approaches the exhaust pipe. There is a small-diameter portion between the cylinder blocks and around this section the carburetor hot-air clamp is fastened. The exhaust valve mechanism is inclosed by cover plates, so that when the engine is in operation not a moving part is visible, and all parts likely to collect dust and dirt are incased.

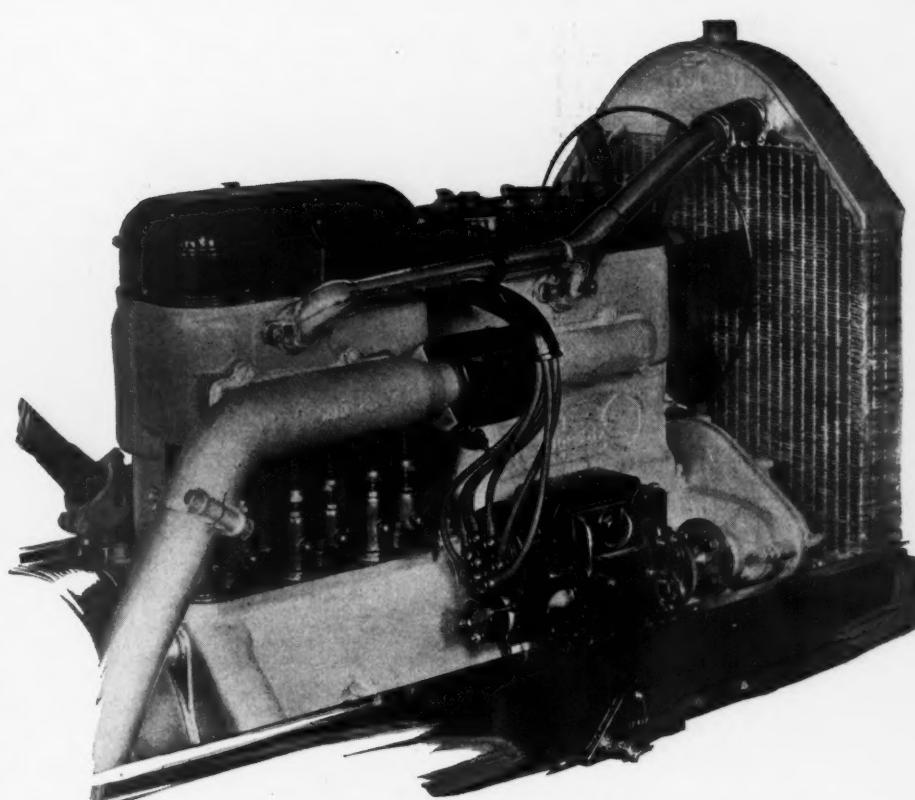
Valve Mechanism Details

The inlet and exhaust valve push-rod assembly are made in units, and fastened down at an angle giving the effect of separate units placed staggard. Each pair is held to the crankcase by a stout stud and nut. The inlet valves are operated by their tappets through long vertical push rods running through the cylinder casting. The arrangement of valves in the Reo six motor is such that the overall length is comparatively short as compared with many six-cylinder straight L-head motors. The oiling system is circulating splash.

Nothing out of the ordinary is seen in the construction of the crankshaft, cam-shaft, etc. The former is mounted on four bearings and the latter on three. The piston rings are of a type designed to prevent the leakage of mixture and oil past them.

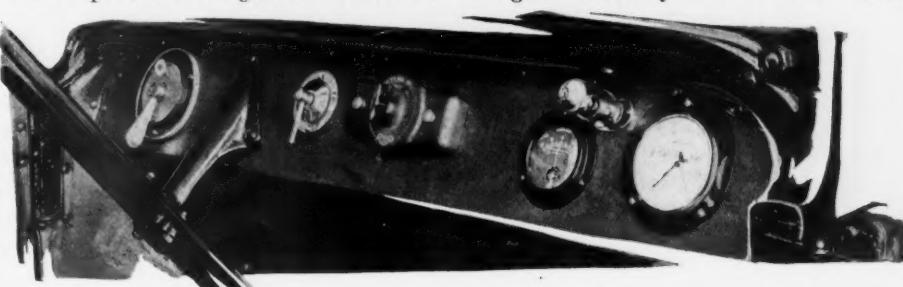
The motor is suspended by four points and is cranked by a Remy 6-volt motor, placed at right angles to the clutch shaft and turning the engine over by means of worm gears. This cranker drive has been in use on the Reo four the past season. In connection with this cranking system is a 100 ampere-hour Williard battery.

A dry-plate disk clutch is located in a fan-type flywheel. The clutch friction surfaces are steel against fabric-faced steel.

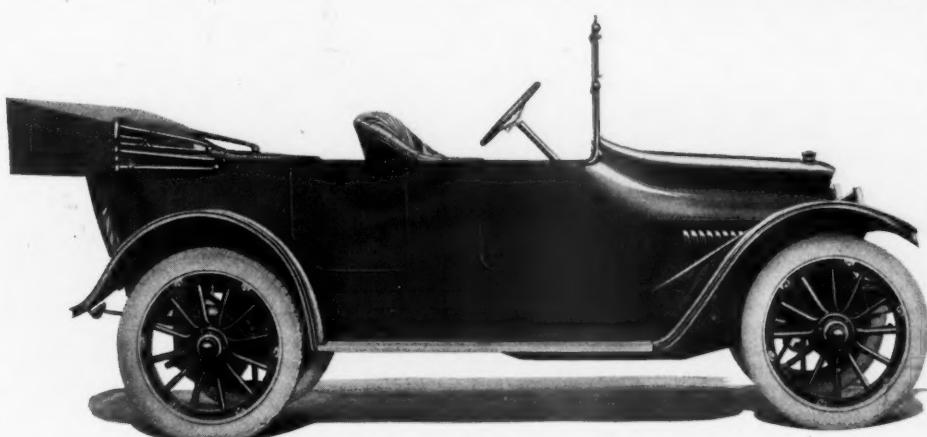


Motor view of the new Reo six. Note the staggard valve tappet arrangement, the complete covering of the head mechanism and the clean appearance of the right side. The Remy combination generator and ignition distributor is shown, also the method of taking heat from around the exhaust pipe through a tube placed between the cylinder blocks to the carburetor. The only accessories on the other side of the motor are the Johnson carburetor and the water pump. The former uses a hot-water jacketed mixing chamber

Behind the clutch and on a sub-frame is a three-speed selective gearset mounted on four arms, operating on Hyatt bearings and being controlled by a lever which has a



Dash view of the Reo four showing the arrangement of the instruments and the method of bracing the steering post



New model of the four-cylinder Reo which sells for \$1,050 or a reduction of \$125 and is fitted with a roomier body, longer wheelbase and new one-man top. Note that the rear doors now are full U-shaped, this having been obtained by the increase in wheelbase from 112 to 115 inches. The new hub caps shown do not require a special wrench for removal, the work requiring only a screwdriver

3-inch throw from neutral to speeds. At the rear end of the gearbox is a universal, to which is attached a gear for driving the speedometer shaft, a method which has been in use on the Reo The Fifth. The drive from the gearset is by an exposed propeller shaft to a floating rear axle equipped with spiral-bevel gears. Both Timken and Hyatt bearings are used in the rear axle.

Propulsion Through Cantilever Springs

Propulsion is through the cantilever rear springs. A V-shaped torque member is fastened at one end to the rear axle housing and at the other to the sub-frame, upon which the gearset is mounted.

There are two sets of rear wheel brakes, one set being controlled by the clutch pedal, the other also by pedal. The latter is internal expanding and is used instead of a lever for emergencies. These brakes

are 14 inches in diameter and 2 inches wide, while the service set are 14 by 2½ inches.

Steering is by worm and sector post on the left side. This post shows characteristic Reo construction, using exposed mechanism. Tires are 34 by 4 on Stanweld demountable rims.

The four-cylinder Reo is being made in three body styles—roadster at \$1,000, five-passenger touring at \$1,050, and coupe at \$1,575. The motor is cast in pairs, 4½ by

4½, and has the inlet valves in the head and the exhaust at the side. Cooling is by centrifugal pump, oiling by circulating splash, using a plunger pump; carburetion by a Holley instrument and ignition by Remy combination generator and distributor. The clutch shows the same design as the six clutch as does the gearbox, controls, etc. However, the rear axle is a semi-floating, the gears straight bevels and the rear springs three-quarters elliptic construction.

far as the particular commodity sold is concerned, and cannot legally fix the price at which the dealer shall resell. The contract does not deal with the use of the motor car sold. Hence, to call it a contract for "restricted sale" is a misnomer, and the adoption of such a definition is, as said by Justice Day, "a mere play upon words." (Bauer vs. O'Donnell.)

U. S. RUBBER EXPORT CO. OFFICERED

New York, Dec. 4—Organization of the United States Rubber Export Co., Ltd., incorporated last week with a capital of \$100,000 under the laws of Delaware, was completed yesterday by the election of these directors: S. P. Colt, president of the United States Rubber Co.; Lester Leland and J. B. Ford, vice-president of the same concern; E. S. Williams, president of the Rubber Goods Mfg. Co.; H. E. Sawyer, general manager of the United States Rubber Co.; R. B. Rice, C. C. Case, W. E. Barker, J. C. Weston, E. H. Huxley, H. S. Hotchkiss and W. J. Maloney. These directors elected the following officers: President, E. H. Huxley; treasurer, W. C. Parson; assistant treasurer, H. S. Hotchkiss, and secretary, J. D. Carberry. The company has been organized to consolidate the export business of the U. S. Rubber Co.

Ford's Agents' Contract Held Invalid

Decision Made in Cincinnati Case

CINCINNATI, O., Dec. 4—An opinion of interest to all manufacturers and dealers in motor cars was handed down to-day by Judge Hollister of the United States district court here, in which he holds that the contracts entered into by the Ford Motor Co. of Detroit, with its agents whereby the resale price of Ford cars was fixed by the Ford company, are invalid. The matter was brought up in a suit filed more than a year ago by the Ford company against the Union Motor Sales Co., Lucian A. Soward, J. Carl Horton, Earl Saunby and William T. S. Yocom, all of Dayton, O.

The Ford company, in this suit, sought an injunction to restrain the defendants from representing that they could and would sell Ford cars at less than the regular list price of the Ford company, from dealing in Ford cars and from "conspiring" with regularly licensed agents of the Ford company to break the company's price restrictions and obtain cars from them at prices less than the regular retail prices as fixed by the company in contracts with its licensed agents.

It was proved at the hearing of the case that the defendants did obtain Fords from regular Ford agents at prices which made it possible for the defendants to resell them to persons holding membership in the Union Motor Sales Co. at a price less by from 10 to 15 per cent than the regular retail price fixed by the Ford company.

The court's opinion covers fourteen type-written pages and discussed at length the rights of a manufacturer-patentee-licensor under the patent laws and under the Sherman anti-trust act. Judge Hollister holds that the supreme court of the United States does not approve of a license contract of the form employed by the Ford company. He says in part:

The rights of the parties depend upon the construction to be given the written contracts entered into between the Ford Motor Co. and its so-called dealers-licensees, and so far no case involving a contract precisely like the agreement between the complainant and the dealers who sell the cars made by it and covered by its patents has been presented to the supreme court. An agreement by the patentee giving to another a license to manufacture under the patent and to sell at a fixed price on small royalty has been held not to come within the condemnation of the Sherman anti-trust act. (Bement vs. Harrow Co.)

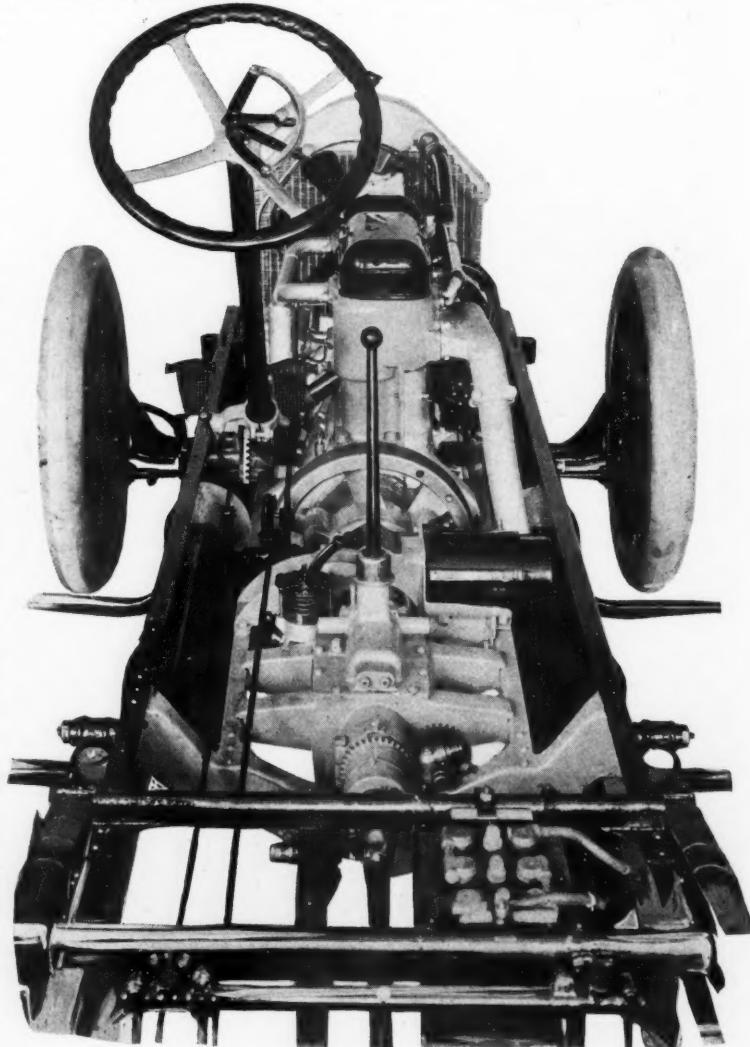
It is conceded that contracts such as made by the complainant with its dealers would, were it not for the fact that the article sold was made by the complainant under its pat-

ents, be contrary to public policy under the decisions in Dr. Miles Medical Co. vs. Park. But it is claimed that since the complainant does manufacture its cars under its own patents it has the right to maintain a monopoly of the exclusive right to sell, granted by the patent laws, by a contract of sale with its dealers fixing the price on resale at which the dealers may sell to the users, although by so doing the competition between the dealers is thereby effectively prevented.

There is, however, a marked difference between these contracts and the license contract to which the supreme court has given its approval. For, in this case, the patentee is the maker and does not, in terms at least, receive a royalty, but actually sells each machine for a price fixed by itself, and is paid by the dealer all that the maker asks for the article sold. There is no question of use or restricted use, as in Henry vs. Dick, for the contract is either a complete sale of the exclusive right to sell, given the complainant under the patent laws, or a license to sell, which involves a reservation of some part of the exclusive right to sell, or, as contradistinguished from these, amounts to a sale.

For the purpose of this case it may be assumed that if the contract partakes of the quality of a sale of the exclusive right to sell, or of a license to sell, it is a good contract which the complainant may legally enter into with its dealers, and under the facts proved in this case an injunction must issue against the defendants.

But if, under the terms of the contract, the complainant has sold the motor cars made by it and delivered the sale to its dealers, passing the title upon the receipt of the contract price, then, under the decisions of the supreme court, and on principle, the conclusion, in my judgment, must be that by such sale the complainant has exercised its exclusive right to sell, so



Chassis view of the new Reo six showing the mounting of the gearbox on a subframe, the speedometer drive from the front universal, the battery location and the position of the Remy cranking unit. Also note the fan-type flywheel. From the flywheel back there is little difference in general design between this car and the four

Mitchell Supplements Its Line with a New \$1,585 Six

Design Like That of the Four—Wheelbase Is 128 Inches

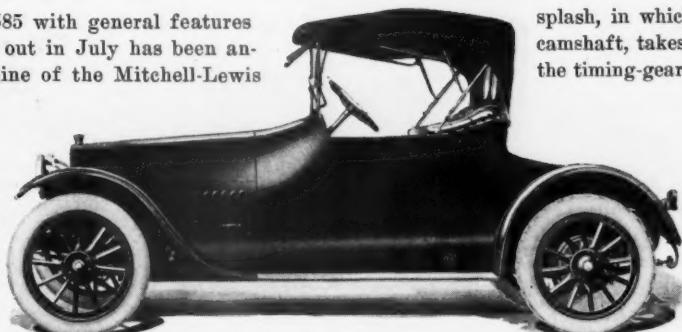
A NEW six-cylinder car at \$1,585 with general features like the \$1,250 four brought out in July has been announced as an addition to the line of the Mitchell-Lewis Motor Co., Racine, Wis. The new Mitchell is of 128-inch wheelbase and is equipped with a 4 by 5½ motor, which, in point of design, is exactly like that of the four.

Among the unique features of the engine are: The mounting of the water pump behind the fan, silent-chain timing gear drive, battery ignition, the reversing of the exhaust manifold, whereby it discharges at the front end near the radiator, instead of at the rear end as is conventional, and the feeding of the fuel by the Stewart vacuum system.

In the running gear is found a pressed-steel cone clutch, a three-speed gearbox mounted separately of the motor, an inclosed propeller shaft and a floating rear axle. Body styles mounted on this chassis are not unlike other Mitchells and show lines common to the present trend.

The Mitchell six motor has the same dimensions as the four; its L-head cylinders are cast in pairs with the valves and manifolds on the left side. The exhaust manifold, however, instead of having its outlet at the rear of the motor, has it at the front, in the path of the draught created by the cooling fan. This assists in reducing the pressure of the exhaust gas, thus supplementing the muffler and it has the added advantage of removing heat from under the driver's seat. Another innovation, but one which first made its appearance on the four, is the water-pump mounting.

This, as previously stated, is behind the fan, where it not only is accessible and close to the radiator, but is driven without much extra mechanism. It is operated by the same endless belt which drives the fan and in the event the water pump should fail the motor will be cooled by the thermo-syphon system, it is claimed. The outlet cooling pipe is rather long and is connected at three points to the cylinders, each connection taking



Roadster model of the new Mitchell six which sells for \$1,585. It comes equipped with Stewart vacuum gasoline feed, one-man top, motor-driven tire pump, etc.

ATTRACTIONS FOUND ON NEW MITCHELL

- Pair-cast motor, 4 by 5½*
- Reverse exhaust manifold*
- Stewart vacuum fuel feed*
- Water pump behind fan*
- Connecticut battery ignition*
- Clean body lines*

care of one pair. The inlet water pipe is rather short, as the pump is directly behind the radiator, but the cylinder feed pipe extends from the pump along the lower portion of the cylinders to a connection at each pair.

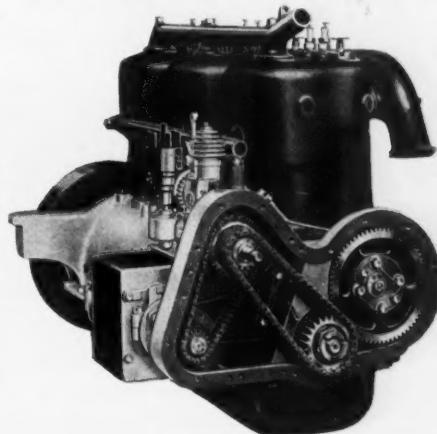
Crankshaft Offset 1 Inch

The crankshaft is supported on four bearings and is offset 1 inch. At the forward end of the shaft is a double drive. One is a sprocket and the other a gear. The former, by means of a silent chain, drives the battery ignition distributor and by further reduction the lighting generator. The gear is in mesh with one on the camshaft, which is on the right side of the motor. The camshaft operates valves of 1½ diameter with the mechanism inclosed by cover plates. The inlet valve lift is $\frac{5}{8}$ and the exhaust $\frac{3}{8}$ inch.

Nothing foreign to past Mitchell practice is seen in the lubrication of this engine. The system is called circulation

splash, in which a plunger pump, driven from the camshaft, takes oil from a reservoir and forces it to the timing-gear case, the troughs under the connecting rods and to a dash sight feed. This sight has two leads, one running to the rear crank-shaft bearings and the other to the clutch bearings. While the crankcase is of aluminum the splash basins and oil reservoir are contained in a pressed-steel lower portion which readily is removable.

Carburetion on the new Mitchell is by a special Rayfield carburetor fed by gravity from a Stewart vacuum tank. The main fuel tank, of 18-gallons capacity, is in the rear of the chassis. Ignition is by Connecticut distributor. Cranking and lighting is accomplished by a single-unit mounted rather low at the right forward end of the motor and connected indirectly

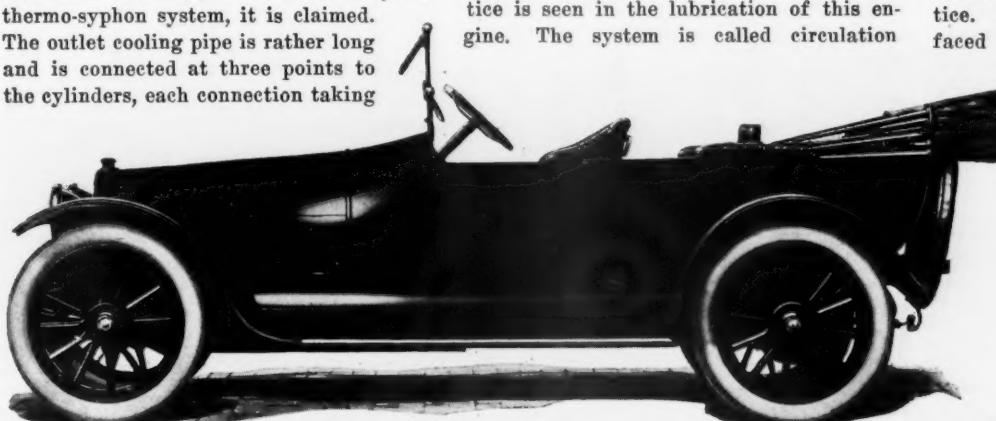


Six-cylinder motor used in the new Mitchell. Note the silent-chain drive on the auxiliary motor shafting and the position of the ignition distributor and power tire pump

by silent chain with the crankshaft. The battery is connected so as to give 12-volt cranking and 6-volt lighting.

Clutch design is similar to that used on the four and is new to past Mitchell practice. It is a cone, made of pressed-steel, faced with leather and provided with three steel, coil springs to effect easy engagement. The main clutch springs are three in number, helical in design and positioned so as to be adjusted easily.

Behind the clutch is a rather wide frame cross-member for holding the control levers and their mechanism and also acting as an auxiliary support for the gearbox. The latter is a three-speed affair and driven by a shaft inclosed in a torsion tube to a floating rear axle with a ratio of 4 to 1.



New six-cylinder model brought out by the Mitchell-Lewis company. This car sells for \$1,585 and is equipped with an L-head, cast-in-pairs motor 4 by 5½. The wheelbase is 128 inches and tires 36 by 4

Constructional Details of New \$1,395 Six-Cylinder Paige

Block Motor 3 1-2 by 5 1-4—Cantilever Rear Springs

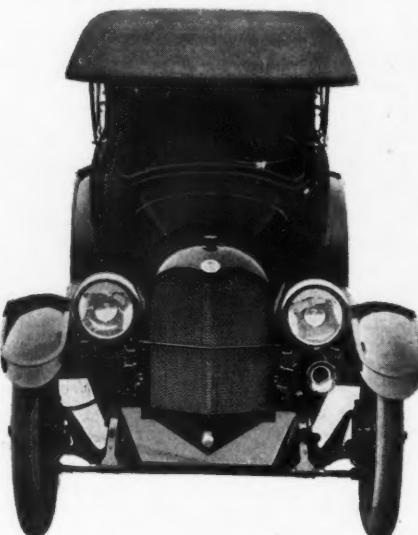
FOR the first year in its history, the Paige-Detroit Motor Car Co., Detroit, has a six as a consort for its four-cylinder model. Details of this new six are just coming to light and reveal a very attractive outward appearance for both the touring and roadster bodies that are fitted to the chassis at the price of \$1,395 with full equipment.

The bodies are streamlined in latest fashion, there being a continuous slope from the front of the bonnet back to the end of the cowl. This, coupled with the wide doors with concealed hinges and handles, substantially-mounted domed fenders and pointed radiator with rounded top are beauty marks not to be overlooked.

FEATURES OF THE PAIGE SIX

- Wheelbase 124 inches
- Streamline body
- Cantilever rear springs
- Motor a Continental
- Removable cylinder head
- Bosch ignition
- Disk clutch and floating axle

The valves are on the right and inclosed by cover plates. The carburetor is placed on this side, distribution of the gases to the several intake ports being effected within the casting itself.



Front view of the Paige six showing the high, odd-shaped radiator



Newly-announced six-cylinder Paige which sells for \$1,395 with Gray & Davis cranking and lighting. The wheelbase is 124 inches, the rear spring suspension by cantilevers and the motor a Continental

The car has 124-inch wheelbase, 3½ by 5¼ block-cast engine with three-speed gear-set in unit, Gray & Davis lighting and cranking, center control with left drive, cantilever rear spring suspension, cowl gasoline tank, 34 by 4 tires, floating rear axle and Bosch magneto as the high spots in its specifications.

There is nothing departing from the conservative in the design of either motor or chassis, but the whole has been combined to make a very sturdy and accessible job. This impression is immediately created in the mind of the mechanically-inclined on looking over the general layout.

The engine is a specially-designed Continental arranged in accordance with Paige requirements. It is suspended in the chassis at three points and is of the type having the cylinder block and upper half of the crankcase cast in one piece. The cylinder head is removable and gives access to valves and pistons. It is held down by studs, and to prevent leakage, a copper-asbestos gasket is placed between head and main casting.

The drive for camshaft and magneto, pump and generator units is well worked out. A cross shaft at the front end of the engine is driven by a large bronze spiral gear on the end of the crankshaft. The cross shaft, in turn, drives all the auxiliary parts through steel spiral gears which operate in oil. The chief advantages claimed for the drive are silence, accuracy in maintaining valve timing.

Conventional Tappets Not Used

The camshaft is the usual form of drop-forging with the cams integral and is carried on three bearings. One feature in connection with the valve mechanism is a simplification of the standard method of valve actuation. No tappets are used, the valves being pushed up by means of small rockers pivoted in carriers. These rockers carry rollers on their free ends which bear against the cams. The construction relieves the stems of any side thrust due to the cams and at the same time allows the camshaft to be mounted somewhat nearer to the centerline of the engine with greater compactness as the result. Adjust-

ments are provided on the ends of the rods to take up any wear.

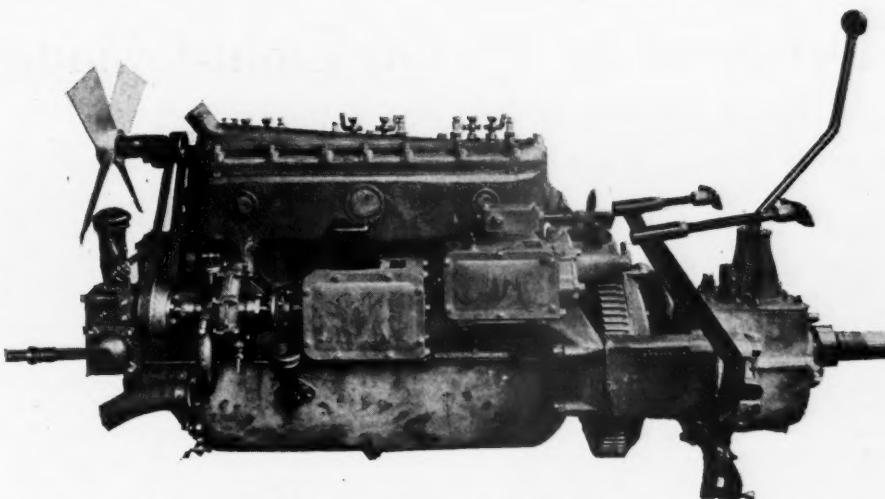
The working parts are all well balanced and made as light as possible consistent with strength. The crankshaft is a three-bearing type; connecting rods are I-beam drop-forgings; and pistons are of gray iron fitted with three rings above the wristpin. Several oil grooves below the pin aid in oil distribution.

Pressure and Splash Oiling

Lubrication is of the pressure and circulating splash type, the oil being kept in motion by a plunger pump operated by an eccentric on the camshaft. The three main crankshaft bearings are oiled by leads running directly to them. Oil is drawn up from the pressed-steel oil reservoir at the bottom of the motor. On the ends of the connecting-rods there are small pressed-steel dippers which dip into the lubricant in individual troughs and send it to the crank-pin bearings and splash it to the valve mechanism, cylinder walls and cam-shaft bearings.

On the left side of the rear motor supporting arm is mounted the model Y Gray & Davis cranking motor which incorporates as a unit the pinion which is shifted into mesh with the flywheel teeth. The unit is very accessible and its entire removal from the engine is effected by taking out four bolts. The motor is rated at 6 volts, 100 amperes and 2,800 r. p. m.

The lighting generator is placed just forward of the starting unit and on it are carried the current regulation devices. It is held down by two cap screws and a clamp and is driven by a flexible coupling from the pump shaft. This generator is rated at 6½ volts, 10 amperes at 500 r. p. m. The whole electric system is of the single-wire type and incorporates a Willard 90-ampere-hour storage battery.



Six-cylinder motor used in the new Paige. It is of Continental make and is equipped with a Bosch magneto and Gray & Davis Cranker

Just forward of the generator on the left side is the 4½-inch centrifugal water pump. On the pump shaft, which runs at one and one-half times engine speed, is located the pulley for driving the 16-inch fan. As already pointed out, the pump shaft is driven by spiral gears through connection with the transverse shaft at right angles to it at the front of the engine. On the opposite end of the transverse shaft is another pair of spiral gears which drive the shaft of the Bosch DU 6, magneto.

Uninclosed Flywheel Used

In the flywheel, which is not inclosed, is the clutch made up of seven steel driving disks, and seven saw-steel driven disks. Each driving disk has thirty-six cork inserts and they engage the flywheel by tongues through the intermediary of a spider, which transmits the power of the gearset.

In combining the gearset with the engine, a yoke construction is employed. An arm of the crankease runs back on either side of the flywheel and the arms of the gearbox attach to the ends of these. Both main drive shaft and counter shaft as well as the gears are constructed of chrome-nickel steel. The forward end of the main drive gear is supported on the rear end of the crankshaft by a roller bearing, and in

the gearset on an annular ball bearing. This gear is bored out and then ground to receive another roller bearing which carries the forward end of the four-splined main-shaft. The countershaft is mounted on Hyatt roller bearings. The gearset lid carries the change-speed lever which swivels in

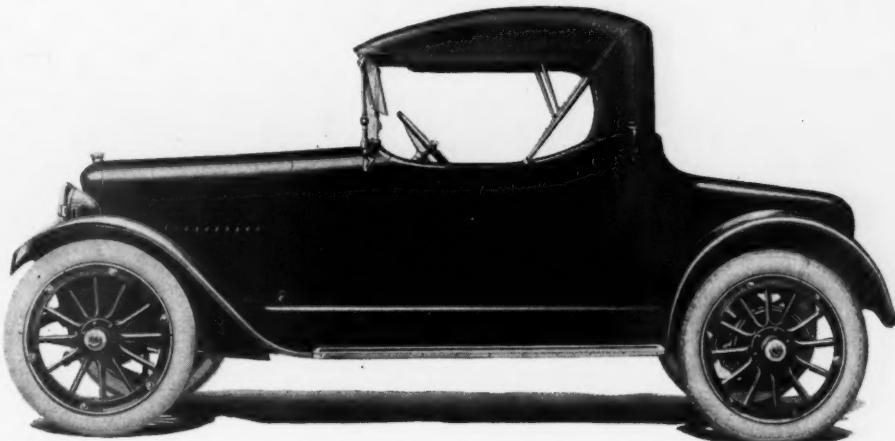
universal on the front end of the rear axle to the final drive. The joints are said to be dust proof and self-lubricating.

The rear axle is of the three-quarter floating type and is fitted with a triangular torque arm with a ball joint on the front end, and supported from a cross member by a hanger with spring cushions. The drive is taken through the cantilever rear springs.

Rear Axle Details

In the rear axle construction, the differential is of the four bevel type and is carried on Hyatt roller bearings. The differential thrust is taken by N. D. ball-thrust bearings and the bevel pinion is mounted on the same make of ball bearings, also fitted with ball thrust. A ratio of 4.07 to 1 has been given the rear axle. This is low enough to give the motor a fair show under all conditions.

The use of cantilever rear spring suspension is new to Paige practice. The springs are long—48 inches—and are largely responsible for the easy riding qualities which the new six possesses. The leaf width is 2½ inches. The regular method



Roadster model of the new Paige six. This car lists at the same price as the touring car, \$1,395

a ball socket and provides center control.

On the rear end of the main transmission shaft is mounted a universal through which the drive is transmitted to the open propeller shaft, and thence through another

of attaching these springs to the frame has been used, there being two points of attachment to the side rails and double-eye connection to the rear axle housing at the rear ends of the springs. The main point of attachment is about mid-way of the spring length by substantial wrought-iron arms riveted to the frame and forming trunnion supports for the spring units.

There are the conventional two sets of brakes on the rear wheels which operate in 14 by 2 inch drums.

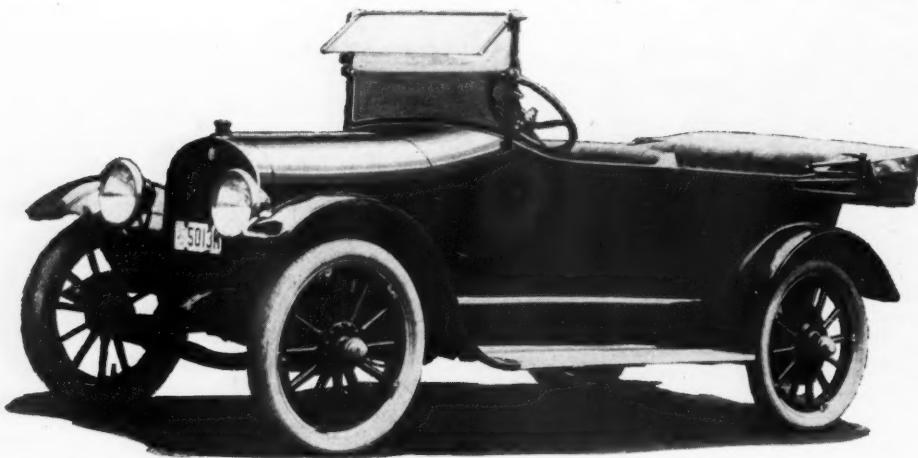
The steering is on the left by a Jacox irreversible nut and sleeve type of construction.

The equipment is very complete and includes such items as two auxiliary tonneau seats in the touring model which fold against the back of the front seat; one-man top and quick-acting curtains; 15-gallon tank for gasoline; non-skid rear tires of either Goodyear or Firestone make; rear tire carrier; demountable rims; rain-vision, ventilating windshield; speedometer; gasoline gauge; tools and so on.



Cantilever rear suspension on the six-cylinder Paige. Note the extra half leaf to take some of the driving stresses

King Co. Discloses Details of Its \$1,350 Eight-Cylinder V-Type Motor 2 3/4 by 5—Second of Its Kind in America



Eight-cylinder King car which sells for \$1,350. The wheelbase is 113 inches and the chassis, with the exception of the motor, is like that of four of the past season. Cranking is by the Ward-Leonard system.

FEATURES OF THE EIGHT-CYLINDER KING

V-type unit power plant
Weighs 10 pounds more than four motor
Valve tappets accessible
Crankshaft like that of a four
Uses one camshaft
Thermo-syphon cooling
Battery ignition
Wheelbase 113 inches
Chassis like previous four
Cantilever rear springs

THOUGH the public has been given some hint of the fact that the King Motor Car Co., Detroit, was to bring out an eight-cylinder car, full details of this, the second American make to carry a motor of the type, were not given out until this week. Priced at \$1,350 with a 2 3/4 by 5, V-type power plant and fitted with a roomy, streamline, five-passenger body on a 113-inch wheelbase, the new King bids fair to do credit to the organization behind it.

The engine is an example of compactness, lightness and accessibility and has 24.2 S. A. E. horsepower. All valve tappets are readily reached, the weight is not more than 10 pounds in excess of that of the four-cylinder King engine; and it has practically the same overall length.

The general chassis design of the King eight does not depart from that of the four-cylinder model. The gearbox, of three-speed form, is in unit with the engine, and other specifications include a propeller and shaft inclosed within a torsion tube, floating rear axle, 33 by 4 tires and the special form of cantilever rear springs which have always featured King cars.

In designing its eight, the King company has adhered to the usual form in that the two blocks of four cylinders are mounted

at 90 degrees to one another on the crankcase with valves facing each other. In looking at the King engine, one is immediately struck by the accessibility of the parts. All tappets may be readily reached for adjustment, the carburetor being practically the only thing placed in the V between the cylinder blocks. The electric cranking and lighting units are carried on opposite sides of the crankcase, while the ignition distributor is mounted at the front of the space between and out of the way.

The stroke of 5 inches is nearly twice the bore of 2 3/4 inches. The exact ratio is 1.82 to 1, and the piston displacement 237.5 cubic inches. Thus the advantages of a long stroke are added to those of continuous turning efforts, and seem to have been united in a happy combination. The motor operates at moderately high speed which is accomplished by the use of light reciprocating parts and well-balanced construction.

Same Length as the Four

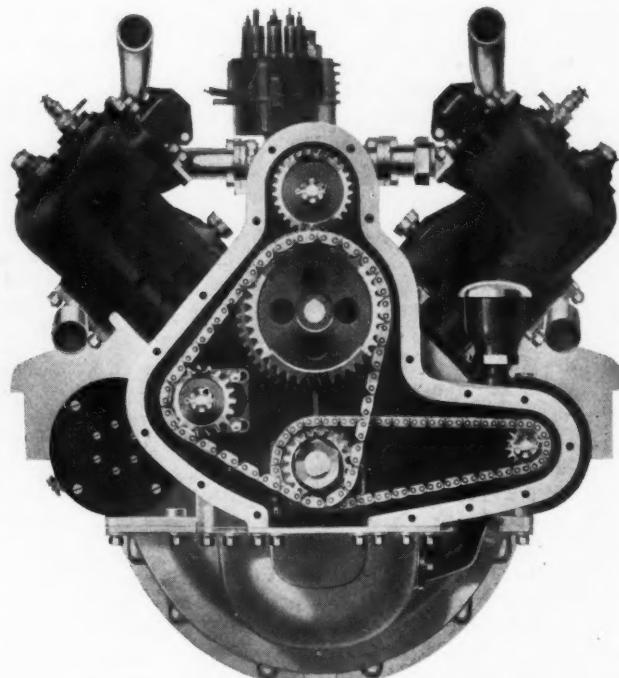
Compactness also is to be noted, for the power plant unit really is practically the same length overall as the four-cylinder King engine. In fact, for test purposes, one of these eights has been installed in a standard four-cylinder chassis without making any changes save the removing of the four-cylinder power plant. As a result of this compactness and lightness of parts,

the engine is said to weigh approximately the same as the four. It may run about 10 pounds more but this really is inappreciable when it is considered that there are twice as many cylinders. Of course, they are smaller cylinders, the four-cylinder motor having a bore of 3 1/2 inches.

In the general design of the motor, the aluminum crankcase is common to both sets of cylinders, the upper half carrying the crankshaft, while the lower part forms the oil pan. The removal of this pan gives access to the bearings.

Simple Three-Bearing Crankshaft

The crankshaft is a simple three-bearing type with the throws all in one plane. In fact, it is in the crankshaft that an eight of the V-type has a distinct advantage over a six even. By coupling two connecting rods to each throw bearing, it is possible



Front view of the King eight-cylinder motor, showing the position of the cylinder blocks, the drive of the single camshaft and auxiliary shafting, the inlet manifolds and the ignition distributor. The dimensions of this engine are 2 3/4 by 5

to use a shaft exactly similar in form to that required for a four. In order to fasten the connecting rods of directly opposite two cylinders to the same bearing, one rod has a yoke end, while the other rod is made with a small end, which goes between the arms of the yoke.

Each of these arms is provided with its cap to go around the bushing. Pins fasten the rod to the bushing so that it oscillates with the rod on the shaft bearing. The small-end connecting rod is free to move on the bushing, its bearing therefore being the outer surface of that portion of the bushing between the arms of the yoke. Both

the main bearings and the connecting-rod bearings are babbitt-lined bronze. All have a diameter of $1\frac{1}{2}$ inch with the following lengths: Front main, 3 inches; center main, $1\frac{1}{4}$ inch; rear main, 4 inches; connecting-rods, $2\frac{3}{4}$ inches.

The camshaft is mounted on three bearings vertically above the crankshaft. Its bearings are in the crankcase, and a plate bolting to the top of the crankcase between the two cylinder blocks gives access to the cam assembly. Like the crankshaft, the camshaft is the same type as would be used in a four-cylinder motor, having eight cams, each of which operates two opposite inlet valves or two exhausts.

Pivoted to the crankcase are small rocker arms which go between the valve tappets and the cams. These are necessary so that the valve lift will be straight upward on the valves, the rockers, though their small rollers bearing against the cams, taking the side thrust. The front camshaft bearing is phosphor bronze, measuring 1 inch diameter by $3\frac{3}{4}$ inches length. The center and rear bearings are of babbitt and their dimensions are respectively $1\frac{1}{2}$ by $1\frac{1}{4}$ inch, and 1 by $2\frac{1}{2}$ inches.

Valve Sizes and Timing

Valves are of conventional bevel-seated type having a diameter of $1\frac{1}{8}$ inch with a lift of $\frac{1}{2}$ inch. With a motor of this kind where each cam does double duty in operating two valves, there is only one practicable timing of the valves. The inlets open at top dead center and close 45 degrees past bottom dead center, while the exhaust valves open 45 degrees before bottom center and close at top center.

The camshaft is driven by a Link-Belt silent chain which in addition to running over sprockets on camshaft and crankshaft is carried over a small third sprocket to the right of the two main ones. This serves two purposes; first for driving the pressure oil pump, and second to give a

means of adjusting the chain for wear. The latter is accomplished by moving the small sprocket slightly to the right so as to increase the distance from the centers of this sprocket and the two main sprockets.

Back of the sprocket driving the cam-shaft and oil pump, the crankshaft carries another sprocket over which another chain runs to the left to the generator sprocket. The position of the generator also may be shifted slightly to take care of wear on this chain. On the camshaft and back of its sprocket there is a spiral gear meshing with a smaller gear which drives the ignition distributor shaft that is directly in

line above both camshaft and crankshaft. As the distributor proper is vertical, a worm and gear mechanism transmits the horizontal drive into vertical. On the end of the horizontal part of the distributor drive shaft is a dog clutch which may be shifted to engage the single-cylinder tire pump mounted on the top plate of the crankcase between the cylinder blocks. Chains and distributor driving gears are all completely housed by an aluminum plate.

The carburetor, which is placed in the V between the cylinder blocks, is a specially-designed type having two openings, one connecting directly to the straight horizontal intake tube running to the single opening in each cylinder block. Distribution to the several ports is effected within the casting. The carburetor is fitted with a hot air pipe, and gets its fuel from a tank carried at the rear of the chassis.

The ignition distributor gets its current from the storage battery, and has hand and automatic control. In firing, the order alternates from one side of the engine to the other so that impulses will balance and an even turning effort result. Calling the first cylinder on the right No. 1, the second on the right No. 2 and so on, and considering the first on the left as No. 5, the firing order is 1, 8, 3, 6, 4, 5, 2, 7.

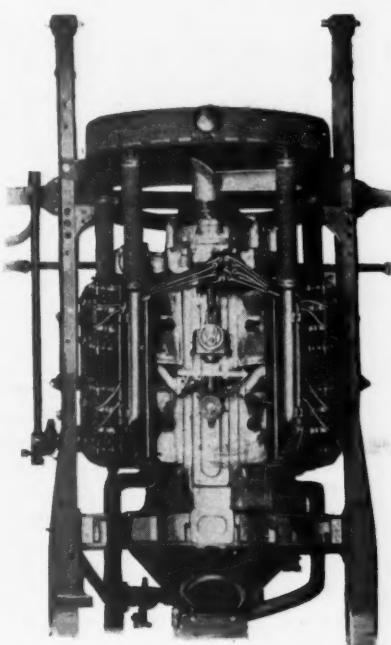
The motor is lubricated by pressure feed by means of the chain-driven pump already mentioned. This pump is of the gear type and brings oil from the oil base up through a horizontal supply tube running along the inside of the crankcase. This delivers oil directly to each of the three main crank-shaft bearings from which it is sent through the holes drilled in the crank arms to the connecting-rod bearings. The center main bearing in this way delivers oil to rod bearings No. 2 and 3, while the front cares for No. 1 and the rear for No. 4. The oil thrown off by the crank bearings lubricates the cylinders and the camshaft bearings.

Cooling by Thermo-Syphon

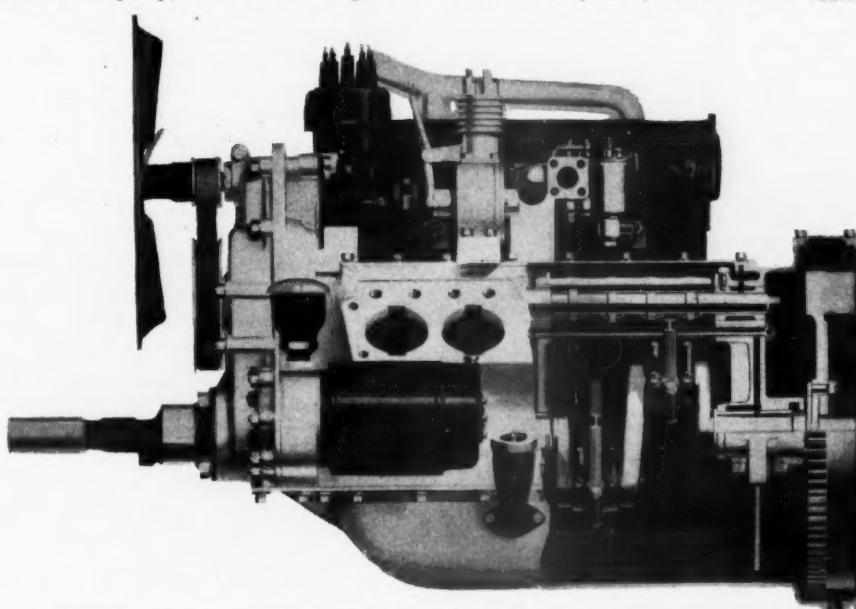
Thermo-syphon cooling is used with marked success, it is said. There are separate outlets and inlets from each cylinder block to the cellular radiator, which is aided in its work by a 16-inch fan. Free circulation is furthered by the $\frac{5}{8}$ -inch water space in the jackets. The absence of water pumps is a factor in securing the simplicity of the design of this eight.

The electric cranking and lighting system, of Ward-Leonard make, is of two-unit type with the generator attached to the outer left side of the crankcase and driven at twice crankshaft speed by a silent chain, as already explained. The cranking unit is on the right rear side of the crankcase next to the flywheel to which it connects in the usual way. There are no intermediate gears, the starter pinion meshing directly with the flywheel teeth when in cranking position. The ratio is 10.5 to 1; that is, the electric motor runs ten and one-half times as fast as the crankshaft.

In connection with the system a Will-



Top view of the King motor installed in the chassis. The cooling is done by the thermo-syphon system ignition by battery system and oiling by pressure. The ignition distributor is shown in the illustration, as well as the two water outlets from cylinder blocks to radiator



Part sectional view of the eight-cylinder King motor showing the crankshaft, which is like that of a four-cylinder motor, the single camshaft, power tire pump and ignition distributor. Note also the position of the carburetor and the cuts in the crankcase at the cylinder base, which allow of connecting rod movement

ard 80 ampere-hour storage battery is used. This is placed under the right front seat, where it is readily accessible. The system operates on 6 volts.

Chassis Is Standard

Nothing new to King design appears in the chassis and drive system. Clutch and gearset are in unit with the motor, a bell-housing bolting to the flywheel housing by flange construction inclosing the mechanism compactly. The King clutch is a multiple-disk type running in oil with bronze plates against cork-inserted steel ones. The gearset is a conventional threespeed, selective with its shafts carried on roller

bearings. Control levers are in the center

The drive shaft is fitted with a universal at its front end, and back of it enters a compactly-designed torsion tube which is in unit with the pressed steel housing of the floating rear axle. This has a large cover plate at the rear to give access to the differential and driving gears. Ball bearings are used throughout the axle construction.

The braking system is of the usual external contracting service and internal expanding emergency type acting on rear drums, which are 14 inches in diameter by 2 inches wide. The brake-operating rods

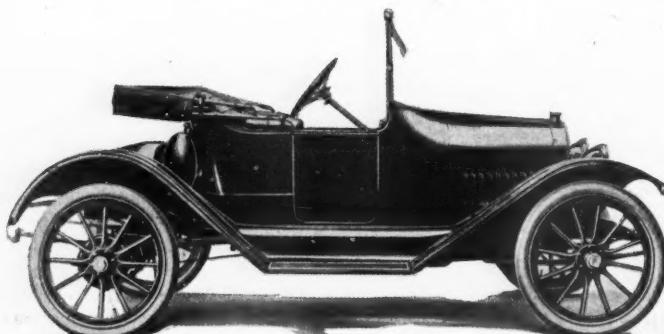
are a part of the rear axle assembly unit.

In this new car, the cantilever form of rear springs is still adhered to, the King company having used them since it brought out its first car some years ago. They have a trunnion mounting to the frame rail a little forward of the center of length, shackle at the rear to the axle housing, and at the front to the frame.

The frame is a bottle-neck design which is light and strong. Three cross members in addition to the bracing given by the motor make it rigid and there is a slight kick-up at the rear to clear the axle. The tires are 33 by 4.

Two-Passenger Monroe at \$460 with Electric Cranker

Exhaust Pipe Attaches to Rear of Motor—Standard Running Gear



New two-passenger Monroe roadster announced by the newly-incorporated Monroe Motor Car Co. This car with full equipment, including Auto-Lite electric generator, sells for \$460. The motor is a four-cylinder, valve-in-the-head

FEATURES OF THE MONROE

Price is \$460 with generator
Four cylinders, 3 by 3½
Connecticut ignition
Zenith carburetor
Cone clutch, and three speeds
Wheelbase 96 inches
Streamline body

FLINT, Mich., is responsible for the latest low-priced motor car, the newcomer being the Monroe, selling at \$460 in two-passenger form and equipped with an Auto-Lite electric generator. It is announced by the Monroe Motor Car Co. and details of the car show few departures from conventional design, perhaps the only one of importance being that the exhaust pipe instead of being attached to the side of the motor is attached to the rear of the cylinder casting making a clean job of the engine at the sides. The Monroe has a 96-inch wheelbase and is fitted with a cleanly-designed streamline body with an appearance of unusual brightness for a car of this type and price.

The units are a four-cylinder valve-in-the-head motor, 3 by 3½ with block-cast cylinders, a cone clutch and three-speed gearbox and inclosed shaft drive to a semi-floating rear axle.

make fed from a Willard storage battery. The automatic advance feature is part of the Connecticut system used on this car. All gears used in the timing case are helically cut. On the generator side is an Auto-Lite cranking motor which meshes with flywheel teeth. This starting system costs \$35 additional.

On the opposite side of the engine is a Zenith carburetor feeding by a short inlet to a passage in the casting. A hot air connection is provided and the flexible tubing is rather long, this having been necessary to reach the exhaust pipe which is fastened at the rear of the motor. The valves are of 1½-inch diameter and are operated by rocker arms. The head in which these valves are located is removable. This motor, as with practically all used in low-priced vehicles of this type, is cooled by the thermo-syphon system. Lubrication is by circulating splash with troughs under the connecting rods.

From the motor back the drive is by a cone clutch and three-speed gearset and thence by shaft inclosed in a torsion tube, to a semi-floating axle.

The frame is slightly tapered. Some of the other specifications are left drive and center control, three-quarter elliptic rear springs and two sets of rear-wheel brakes. Tires are 30 by 3.

The Monroe roadster is sold at \$460 with all regular equipment, including top, wind-

shield with dust cover, Willard battery for ignition, electric lights, horn, jack, etc.

REPORTS ON PREMIER'S CONDITION

Indianapolis, Ind., Dec. 7—Frank E. Smith, receiver, has filed with Albert Rabb, referee in bankruptcy, a statement of the assets and liabilities of the Premier Motor Mfg. Co. The report is a voluminous one, covering about 100 typewritten pages and goes into the most minute detail.

According to the report, the total liabilities are \$508,468.52, and the total assets \$307,376.50. The plant is being operated under direction of the United States court, and the receiver has been doing a very satisfactory business.

The liabilities include unpaid wages amounting to \$5,774.77; priority debts amounting to \$13,846.96; secured debts amounting to \$309,062.54, and unsecured debts amounting to \$160,048.84. The Fletcher American National Bank of this city holds contingent notes amounting to \$107,047.68, secured by unsold cars, which the receiver estimates are worth \$82,137.50.

The assets include real estate valued at \$50,000. The receiver does not state at what value he holds the patents and copyrights. The remainder of the assets include sums due from agents and officers of the company and due from other sources.

CANADIAN MOTORS TO HELP ARMY

Toronto, Ont., Dec. 4—Seven hundred cars have been voluntarily placed at the service of the commanding officer of the troops at Exhibition camp by the members of the Ontario Motor League. The motorists also have agreed to undertake machine transportation of troops and supplies, and will organize a rifle association, shoot, drill and otherwise equip and prepare themselves for any military emergency. The members of the executive committee of the league visited the camp recently and secured a conference with General Lessard and his staff, and made their proposition, the conditions of which the motorists heartily agreed to.

Two New Six-Cylinder Cars Announced by Kline Co.

Motors Now Block-Cast—Cars Alike Except for Wheelbase

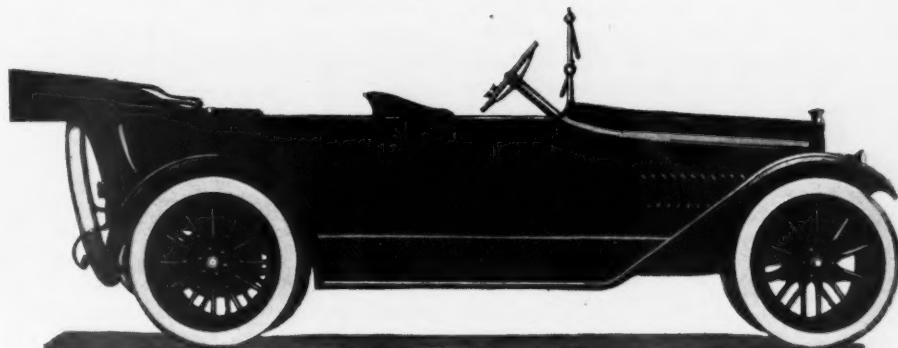
TWO chassis, the 6-42 and the 6-42A practically alike in every respect except in wheelbase, constitute the line of the Kline Motor Car Corp., Richmond, Va., for the ensuing season. The new Kline cars employ unit power plants instead of separate units as heretofore, and block cast cylinders in place of two castings of three cylinders each. The wheelbase of the model 42 is 123 inches and the 6-42A 127 inches, the prices being \$1,750 and \$1,850, respectively.

The new motor is an L-Head, which is not altogether new for this company, as in a previously-manufactured four it was employed, although the T-head has been used on the previous larger models. The three-point suspension heretofore employed has been changed. The pivot point formerly was at the flywheel but now is at the front on account of the change to the unit power plant. The radiator suspension has been changed from the main side members to studs placed in the bottom of the radiator and bolted to a cross-member. This change was made on account of relieving the strain on the radiator due to the twisting of the side members. In practice the company has found that the new suspension works out better as regards the elimination of strains on the radiator structure.

Four-Speed Gearset Discontinued

The four-speed gearset formerly used, which was direct on third and has been replaced by a three-speed gearset. The reason advanced for this change is that the new motor is more flexible and more powerful than the old and the direct drive on high is quieter than the overgeared drive. It has been found, according to the Kline engineer, that a speed of from 3 to 58 miles per hour can be obtained with the regular gear ratio of 3.75 to 1.

The electric starting motor has been changed to the left side of the motor above



New Kline car which is made in two models, 6-42 and 6-42A, the only difference between them being in the wheelbase, the former being 123 and the latter 127 inches. The price is \$1,750 for the small model and \$1,850 for the larger one

FEATURES OF THE 1915 KLINE CARS

- Separate motor and gearset discontinued*
- Motors block cast*
- Three, instead of four speeds*
- Stewart vacuum gasoline feed*
- Spiral-bevel axle gears*
- New radiator suspension*
- New body styles*
- Cranker position changed*

the frame line and bolted directly to the crankcase. This change has enabled the designers to completely inclose the Bendix gear, by means of which engagement with the flywheel is effected, providing a more dirtproof construction and at the same time silencing the engagement. The former mounting was on the right side of the motor below the line of connection to the frame and in muddy weather it was found difficult to keep the dirt from entering between the pinion and the teeth on the flywheel.

The lighting generator now is located on the right side, next to the water pump and is driven by the pumpshaft at 1.5 crankshaft speed. The former mounting was on the frame next to the gearbox and a silent chain drive taken from a gear at the rear end of the gearshaft. The generator has been decreased in speed by the different ratio of the former 3 to 1 to the new 1.5 to 1.

A change in the gasoline system has been effected by

placing the 20-gallon tank at the rear of the chassis and feeding by means of the Stewart vacuum system which carries the gasoline from the rear tank to a small tank on the side of the dash next to the motor and from there to the carburetor by gravity. Formerly there was a gasoline tank under the seat and a gravity system was used. By the new system it has been possible to shorten the inlet manifold which has resulted in a more advantageous carburetion and a more accessible carburetor. There is a gain by this of 3 gallons in the size of the gasoline tank.

How Weight Has Been Reduced

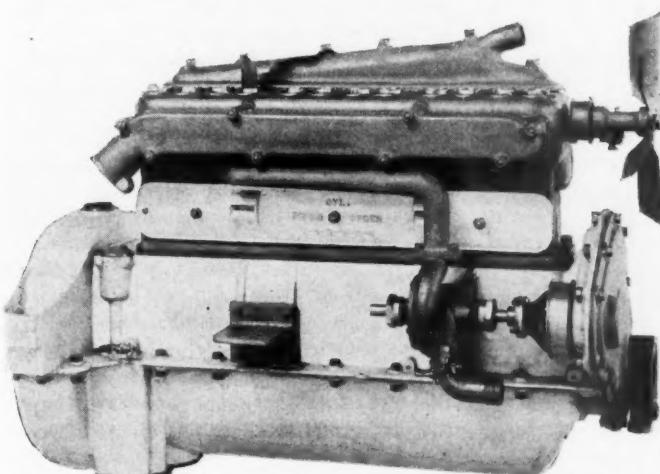
A streamline type of body completes the list of innovations for the Kline car of 1915. It has a rounded radiator and hood, oval fenders, built-in windshield, low, long body lines, an up-to-date appearance throughout. The weight has been decreased by eliminating the sodpan, using a lighter body, lighter top, lighter rims, lighter tire irons, etc., and by the fitting of narrower drip-pans placed between the motor base and frame.

The cylinders are $3\frac{1}{2}$ by $5\frac{1}{8}$ and have their valves on the right side. The manifolds are formed with the intake integral with the cylinder casting and the exhaust separate. Cooling is accomplished by a centrifugal pump which circulates the water through ample water jackets and a cellular radiator.

Lubrication is taken care of by a combination pressure and splash system. The oil is forced by pump to the main bearings and thence flows to the splash trough whence it is splashed to the cylinders and other parts within the motor.

The entire electric equipment with the exception of a Williard battery is taken care of by a Westinghouse system. This operates at 6 volts and provides a dual ignition together with lighting and cranking. The battery capacity is 130 ampere-hours.

The clutch is a dry disk located in the flywheel with the driving surfaces engaging against fabric lining. The power is



Block motor, part of a unit power plant used on the 1915 Kline cars. In previous cars of this make, the motors had cylinders cast in threes and separated from the gearset. The new engine is $3\frac{1}{2}$ by $5\frac{1}{8}$ and is fed by the Stewart vacuum gasoline system

delivered to a three-speed gearbox which on direct provides a reduction of 3.75 to 1. Final drive is by spiral-bevel gears and the propulsion is through the springs. The rear axle is three-quarter floating. Thirty-four by 4 tires and a 123-inch wheelbase are on the 6-42 chassis upon which are mounted a touring, toy tonneau and roadster body, while on the 6-42A chassis the wheelbase is 127 inches, the tires 35 by 4½ and the bodies carried a seven-passenger touring and a seven-passenger limousine. The prices of the bodies on the 6-42 are \$1,750. On the 6-42A, the touring is \$1,850 and the limousine \$2,850.

DEACO CREDITORS MEET

Detroit, Mich., Dec. 4—The first meeting of creditors of the bankrupt Detroit Electric Appliance Co. was held yesterday at the office of Referee in Bankruptcy Lee E. Joslyn. The inventory of the defunct concern was made public and shows that according to the books of the company the assets are worth \$324,967.94, while, according to the Detroit Trust Co., receiver, the value of the assets only is \$168,015.72. The liabilities are shown by the bankrupt company to be \$224,967.94, while the Detroit Trust Co. has placed them at \$90,957.19. According to three special appraisers the tangible assets are valued at \$35,207.

GARAGE QUESTION PENDING

Boston, Dec. 5—Next week it is expected that the matter of whether or not all the garages and service stations of the motor dealers in what is termed metropolitan Boston, which embraces Boston and surrounding cities and towns within an area of about 15 miles, will have to install separators at a cost of several hundred dollars each will be taken up. It would not be surprising if Fire Hazard Commissioner John A. O'Keefe would compromise with the motor organizations and frame rules guaranteed to prevent danger without the necessity of every one installing a separator. If that is done it will be the result of energetic, intelligent action on the part of the officers of the motor organizations, who have been working on the matter.

STRIVE TO HOLD UP PRICES

Boston, Mass., Dec. 5—The plans of the men who have been working for some months to get the accessory dealers of Boston welded into some sort of an organization for their own protection now is bearing fruit, and at the next meeting, which is scheduled for this month when directors will be chosen to do the executive work the plans will be fully outlined and the Boston Accessory Dealers' Association will be well on its way to solidarity. One of the hardest tasks before the organizers was the combining of the radical and the conservative elements so that they could meet upon a common basis. Some of the

radicals at first favored a plan whereby they would put it up to the manufacturers direct to deal only with those who became affiliated with the association and agreed not to cut prices. Finally a half-way basis was worked out for the benefit of all, and the new association promises to become very strong in the near future.

SAVAGE'S OFFICIALS ACQUITTED

Cincinnati, O., Dec. 7—The trial of Delbert H. Cummings, Robert W. Fishback and Edwin E. Taylor, president, vice-president and secretary, respectively, of the Savage Motor Co., charged with using the mails in a scheme to defraud was brought to an abrupt close in the United States court at Cincinnati last week when Judge Hollister ordered the jury to bring in a verdict for the defendants. He held that there was not sufficient evidence adduced showing an intent to defraud.

The three men had received on the average of about \$200 in deposit each from about 300 agencies to handle the Savage 20, which never was placed on the market. The defendants claimed that it was because of their arrest that they were unable to place the car on the market.

REPORTS VENEZUELA OUTLOOK

Cleveland, O., Dec. 4—Before the European war started W. S. M. Mead, export manager of the Chandler Motor Car Co., had planned an extensive business trip through Europe. When the war broke loose that schedule was changed into a

voyage to South America. A few days ago a lengthy report was received from Mr. Mead as to conditions in Venezuela.

"The importation of motor cars in Venezuela," writes Mr. Mead, "has been comparatively limited, there being only 250 cars in use in and about Caracas, the capital. Practically all of these, with the exception of a few foreign cars, sell at a very low price. Through the efforts of the former president, Gomez, a very good stone road has been built from La Guayra, the seaport, to Caracas, a distance of about 30 miles. The road reaches an altitude of 3,000 feet near the capital. This road and two others are the main motor thoroughfares of the country. With the addition of more good roads, which already are promised, the sale of motor cars undoubtedly will increase."

While in Caracas, Mr. Mead arranged with Fernando Marquis of the central garage to handle the Chandler cars in Venezuela.

FEDERAL HAS TWO NEW MODELS

Detroit, Mich., Dec. 5.—The Federal Motor Truck Co., which thus far has made only chain-driven trucks, now is placing on the market two worm-driven models, both of 1½-ton capacity. Both models sell at \$1,900, and while model J has a wheelbase of 120 inches, model K's wheelbase is 144 inches. Both have Continental motors 4½ by 5¼. Tire sizes are 36 by 3½ on the front wheels and 36 by 5 on the rear wheels, or dual tires.

Motor Truck Saves Shipwrecked Sailors

Federal Figures in Thrilling Rescue

SAN FRANCISCO, Cal., Dec. 3—The motor truck has been employed for many uses since its inception, but perhaps the latest role in which the power-driven wagon has distinguished itself took place in the vicinity of San Francisco bay last Monday when a Federal 1-ton truck was used to aid in the rescue of the passengers and crew that were wrecked on the steamer Hanalei.

The wreck occurred on the rocky shores of Bolinas bay, some 25 miles from San Francisco. The steamer went ashore in a dense fog at night. Wireless communication on the steamer informed the shore of the position and condition of the vessel. There is no life-saving station within 15 or 20 miles along this coast. The life-savers from the stations, owing to the thickness of the weather and the roughness of the sea, were unable to launch their boats and steam to the scene of the disaster.

Tugs and steamers that were attracted by the wireless cries for help rushed to the scene, but were unable to launch their boats or do anything to aid in the rescue. The people on board the doomed vessel were seen hanging to the rigging, but

little, if anything, could be done for them.

It was then decided by Captain Nelson of the San Francisco life-saving service that the only way to reach the vessel was by motor vehicle from the land side. As a result, W. L. Hughson, president of the Pacific Kisselkar company, offered the services of a 1-ton Federal truck to the life-savers. On this vehicle was loaded several life lines and one of the government's famous life-line guns and a crew from the life-saving station.

The start was then made for the scene of the disaster by way of Sausalito. From the latter point it was some 22 miles over some stiff grades and roads that now are under construction. A speed of 25 miles an hour was rigidly adhered to and the truck, as though it felt the responsibility of the men who piloted it did not falter. It reached the shore opposite the wreck in time for the life-savers to get a line aboard the sinking ship, and all but nineteen were rescued as a result.

Those that were lost had been washed from their places in the rigging or had drowned in an effort to get ashore before aid arrived.

The Motor Car Repair Shop

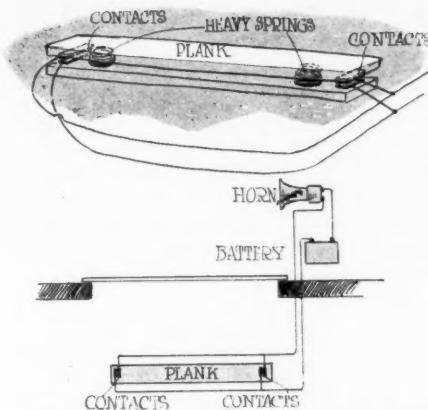


Fig. 1—This shows an automatic bell ringing system whereby a car about to enter a garage will by means of its own weight on a plank in front of the door, ring a bell or sound a horn within. The construction is simple, comprising two planks with contact points at their ends connected to the current line as shown. The planks are kept apart by stout springs, but the weight of the car compresses the springs, brings the contact points together and so operates the signal.

Automatic Bell-Ringing System

A N automatic bell-ringing or horn blowing scheme can be made to notify the man in the garage office that a car is to be driven in. This arrangement consists of two planks of wood with metal contacts at their ends, as shown in Fig. 1. These planks are placed in the path of the incoming car, preferably a few feet from the garage entrance and on the sidewalk. From the contact points two wires are run as shown and these wires are attached to the battery and horn or bell, as the case may be. When the weight of the car rests upon the plank the horn circuit is closed and the signal is given that a car is to be driven into the building.

Repairing Generator Governor

In one type of Gray & Davis generator lead weights are used as part of the governor. Recently an owner discovered a knock coming from the generator and after dismantling the unit at the service station it was found there was play between the governor weights and the part over which they fit. Simply by peining the outside of the weights the play was taken up and the system gave no trouble. The weights and the portion slightly flattened, is shown in Fig. 4.

Trouble With Thrust Washers

Many cars are fitted with thrust washers in various places and these washers in time become worn. In many instances the wear is very rapid. This is due somewhat to the fact that no oil grooves are provided on the washer and hence when oil attempts to make its way to the face of the washer it is squeezed out. A good plan is to have grooves cut into the washers so that oil

An automatic bell-ringing system. A simple gear-puller. A sprag to assist the brakes

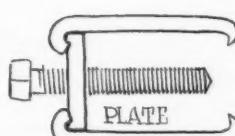
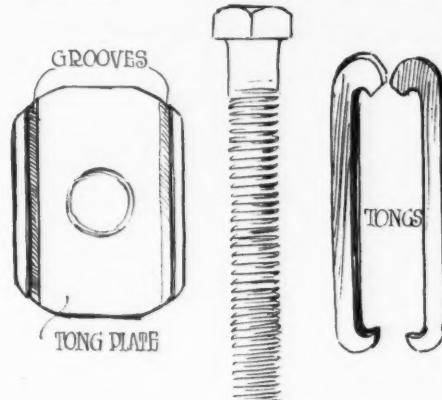


Fig. 2—A simple timing gear puller made of old parts found around the shop. The plate is a piece of steel grooved as shown to receive the ends of tongs. The other ends of the tongs are curved to grip the gear. The puller is adjustable because the plate may be moved to any point on the bolt.

can be distributed over the bearing surface and thus prevent excessive wear.

Safety Sprag for Hill Climbing

Mountain traveling by motor car often is dangerous, especially on heavy grades where it is necessary to stop the engine in order that it may cool. Under these conditions the home-made device, shown in Fig. 3, has been found very effective on the mountain roads of California.

On the rear axle close to each wheel is attached a clamp with an iron bar loosely

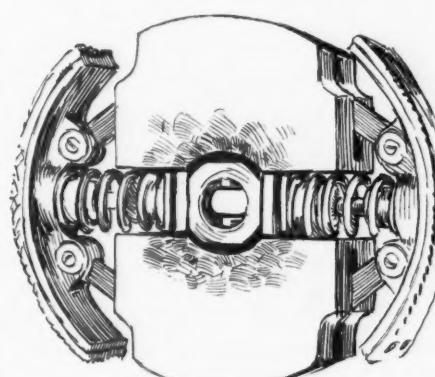


Fig. 3—Showing how a generator governor was prevented from knocking. The lead weights of the governor slapped sideways and the remedy consisted in slightly tapping the weights around the curved portion. This brought the two sides closer and hence removed the play which caused the knocking.

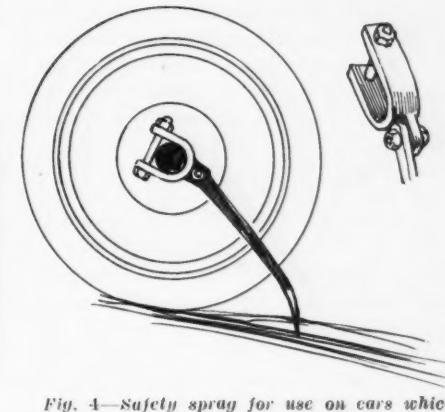


Fig. 4—Safety sprag for use on cars which are frequently driven through hilly country. This has been suggested by a San Francisco reader of Motor Age

bolted to it. The end of this bar which is of 1-inch iron, drags on the ground. When the car stops on a grade these bars automatically prevent the machine from running backward. The brake is not necessary. Although the bar drags on the ground it will clear any obstruction the machine will go over. Any blacksmith can make a pair of these and the cost is but little. This device has been suggested by C. H. Noyes, a San Francisco reader of Motor Age.

A Simple Gear Puller

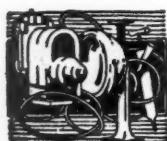
Many owners spend the winter nights making various tools to be used for overhauling work later in the year. A simple gear puller for motor timing gears is shown in Fig. 2. It consists of a pair of tongs with the ends curved as shown, a large-diameter bolt and a plate. The plate is grooved on both ends, the grooving being so made as to receive the upper hooks on the tongs. This type of puller is adjustable because the plate may be moved upward or downward. In operation the hooks grip the gear, the bolt end is placed in the center of the gear and then turned with a wrench.

White Lead for Spring Leaves

White lead between the spring leaves is considered by many on a par with graphite as a means of preventing squeaking and rusting. Each leaf should be painted with a good grade of white lead. The coating should not be too thick.

Inspecting the Wiring

The motorists whose cars are equipped with electric lights should inspect the wiring periodically for broken insulation, loose contacts, etc. Especially in one-wire systems will poor insulation cause trouble, for in this system only one ground is necessary to cause a short circuit. When inspecting each wire should be traced from end to end and every intermediate contact examined.



The Accessory Corner



Hartford-Ford Economizer

ONE of the latest Ford accessories in the nature of a fuel economizer is that announced by the Hartford Suspension Co., under the name of the Hartford economizer. In action this device takes heated air from around the exhaust pipe and passes it by means of a pipe to a flange inserted between the carburetor and inlet manifold. The heated air at the flange meets the mixture which has left the carburetor. By means of a small screen in the flange the mixture is broken up, it is stated, and the globules of gasoline divided so finely that the resultant mixture which is used in the motor gives a much more powerful explosion than would the untreated mixture. In the Hartford system, then, the mixture not only is heated but in addition is broken up by means of the screen.

The system installed and also separated from the motor is shown in Fig. 2. In this illustration the heating unit is shown clamped to the exhaust manifold. This unit merely is a casting containing a passage for the heated air. The air from around the exhaust pipe in the proximity of the unit, passes through a short brass pipe, through a control valve and into the flange placed between the carburetor and manifold. The screen in the flange breaks up the mixture and the hot air from the heating unit passes into the manifold with the finely-divided fuel. The hot air rushing into the hollow flange also assists in breaking up the mixture.

The control of this system is on the steering wheel as shown. This control operates the shut-off valve at the lower end of the brass pipe. This control allows of the heated air being regulated in order to obtain the maximum economy for a given speed. It is stated that with the throttle unmoved a change of position of the economizer control will affect a noticeable change in motor speed. The installation of this system is not a difficult matter, requiring only the separating of the car-

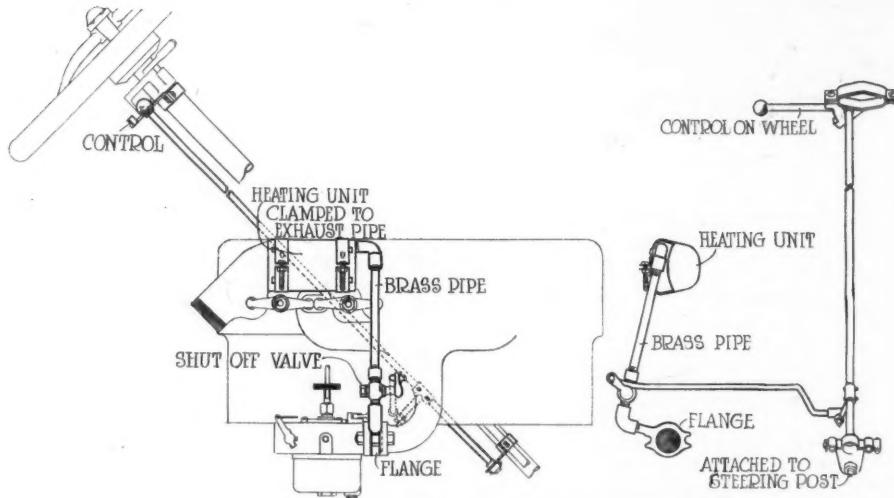


Fig. 2—Hartford Ford economizer, together with method of installation. This new accessory is claimed to increase the mileage per gallon of fuel, because it breaks up the globules of gasoline in the mixture and at the same time heats it. The air is taken from around the exhaust pipe and passed through a brass tube to a hollow flange within which is a screen. The screen breaks up the mixture and the hot air assists and also supplies heat to effect rapid vaporization

buretor from the inlet manifold, the clamping on of the heating unit and making of the connections to the control mechanism.

New C. C. Ford Shock Absorber

A new type of shock absorber for Ford cars has just been brought out by the Cox Brass Mfg. Co., Albany, N. Y., this latest

of this absorber is shown in Fig. 1 and the method of attachment in Fig. 6. On the rebound of the Ford springs, it is stated, both springs within the absorber casing come into action and so reduce to a minimum the shock transferred to the body and passengers. The method of attachment is simple, it is stated, requiring not more than 1 hour.

Special Gears for Fords

Many Ford owners are desirous of changing the motor to wheel ratio by installing a new set of rear axle gears. A new maker of such gears is the Detroit Radiator & Specialty Co., Detroit, Mich., which is offering differential ring gears and drive pinions with either 3 to 1 or 2 4/7 to 1 ratio. The price is \$15. It is stated that with the 3 to 1 set a speed of 55 miles per hour is possible and with the 2 4/7 to 1 ratio, 60 miles per hour is obtainable.

Progressive Carbon Remover

An oxygen carbon-removing outfit which generates its own gas, collects it over

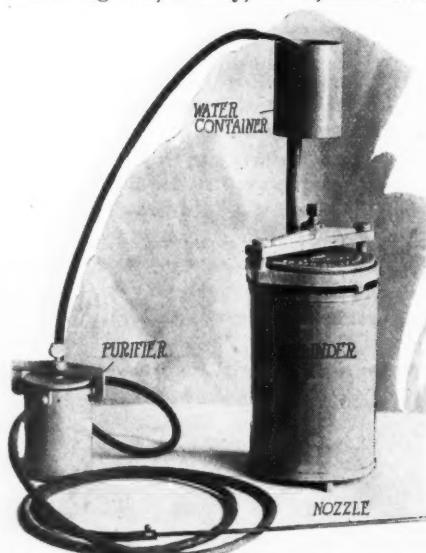


Fig. 3—An oxygen-carbon removing outfit called the Progressive. This outfit is a self-generating system. The cylinder shown is a receptacle for chemicals which when heated by an alcohol flame give off oxygen. This is collected in the water container and then passed to a purifier, from whence it travels to the nozzle

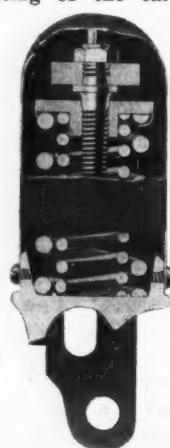


Fig. 1—New Ford shock absorber brought out by the Cox Brass Mfg. Co. This absorber sells for \$8 per set of four, and instead of having but one spring it has two. The smaller one shown assists the larger and on the rebound, it is claimed, both come into engagement

device selling for \$8 per set of four. The new absorber takes the place of the shackles on the Ford spring. The C. C. consists of a casing within which is one large spring and a smaller one, the first carrying the weight of the car and cushioning the road shocks, while the second assists the large spring. A sectional view



Fig. 4—New Presto electric trouble lamp which is attached to a dry cell as shown above. The lamp may be turned as shown by the dotted lines. The handle of the lamp itself is the switch for the tungsten bulb

water, purifies it and then forces it through a nozzle into the cylinder of a motor, is being manufactured by the Progressive Mfg. Co., Reading, Pa., and sold for \$7.50. This outfit complete is shown in Fig. 3 with the parts lettered. The cylinder has underneath it an alcohol-burning lamp. Into the cylinder is placed a special compound furnished with the outfit, the clamps above the cylinder allowing this to be done. With the compound in place and the lamp burning, oxygen is generated in the cylinder. The gas passes to the water container where the oxygen is collected and then passed through another vessel containing a purifier for the gas. From this container the oxygen passes through the nozzle and into the cylinder. A lighted match thrown into the cylinder will start the carbon burning because of the presence of oxygen. Additional compound for generating the gas may be obtained of the manufacturer at 75 cents for each charge which is sufficient for four cylinders.

Indicator for Fuel Consumed

To be able to tell the fuel consumed on any trip and also to find the mileage per gallon is the object of a small device just announced by the Fuel Meter Co., 937 East 54th street, Chicago. This instrument has an indicating mechanism on the dash of the car, this indicator being in the form of a plate with two scales, one showing the amount of fuel consumed for the trip and the other the total gallons used. In this way it is possible to tell by looking at the speedometer for the trip mileage the fuel consumed for the distance. The construction is simple, it is claimed, the meter being essentially a liquid register performing the same function as a water meter which registers the amount of water consumed. An added claim is that it is possible to read correctly, regardless of the variation in pressure in the fuel line. The fact of the meter is shown in Fig. 7, and up to this time the details of the working mechanism have not been available but in a short time Motor Age will show these.

Presto Electric Hand Lamp

A trouble lamp of new design is announced by the Metal Specialties Mfg.



Fig. 5—Improved Osgood deflector, which is in the form of a special prismatic lens designed to eliminate headlight glare

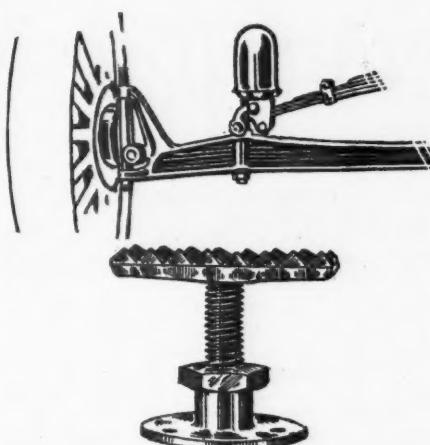


Fig. 6—Upper illustration shows the new C. Ford shock absorber as applied to the front spring. Lower illustration is that of the Fuqua foot rest designed to make operation of the accelerator pedal less tiring

Co., 738 West Monroe street, Chicago. This lamp is attached to a dry cell and the two carried about by means of a suitable handle, as shown in Fig. 4. The connections between the lamp and the dry-cell terminals is indeed simple and has the advantage of allowing the cell, after being used for the lamp, to be used for ignition, etc., and the lamp to be placed in the tool box. The bulb used has a tungsten filament and is inserted in a suitable reflector. The lamp handle serves two purposes, that of a switch and a connection for a wire to one of the battery terminals. The illustration shows by means of the dotted lines how the lamp may be turned so that light may be directed upon any desired object. It sells for \$1.25 with battery and \$1 without it.

Fuqua Foot Rest

In order to make operation of the accelerator pedal easy by resting the foot, Fuqua Bros., Richmond, Va., has brought out the accessory shown in Fig. 6, called the Fuqua foot rest. It is fastened to the foot boards at the place most convenient to the driver. The rest is adjustable by the small lock nut shown. It sells for \$1.

Improved Osgood Deflector

A headlight glare remover in the form of a prismatic lens is being marketed by the Osgood Autolite Deflector Co., Chicago. In the new type the deflector itself is the lamp lens whereas in the model first introduced the deflector was fastened over the regular lens. The new deflector is shown in Fig. 5 and the price is \$5 per pair for any size headlight.

New Westinghouse Motor-Generator

A motor-generator set designed for charging batteries used in connection with cranking and lighting systems, is announced by the Westinghouse Electric & Mfg. Co., Pittsburgh, Pa. This new unit comprises an alternating current motor operating at 110 volts, of 60 cycles, and a direct current generator. The latter is rated at 10 amperes and it is capable of charging two 6-volt batteries or one 12-

volt. Its voltage can be regulated from 6.3 to 12.6 by means of a field rheostat. The method of operations consists in attaching a plug to the 110-volt lighting line turning on the current and adjusting the rheostat until the desired charging voltage is obtained. The generator winding is such that its voltage rises automatically at the end of the charge so that each cell receives 2½ volts.

This set is 19 inches long, 7¾ wide, 8¾ high and weighs 140 pounds.

Purair Tire Pump

Two new types of motor-driven tire pumps have been introduced by the Hert Mfg. Co., Indianapolis, Ind. The new pumps offered are a one-cylinder selling at \$12.50 and being designed especially for the model 79 Overland and a two-cylinder selling at \$16.50. These are air-cooled pumps with bronze connecting rods, steel crankshaft and gray iron pistons fitted with three rings.

Ellington Motor-Generator

A charging plant for electric vehicles which is carried permanently on the car has been brought out by the Ellington Electric Co., Quincy, Ill. This outfit consists of an alternating current motor of 110 or 220 volts, 60 cycles and a generator mounted on a common shaft. The whole unit weighs less than 100 pounds, it is claimed, and occupies a space 15 by 8½ by 8½ inches. The apparatus is furnished with automatic controls and all connecting wires and plugs, and all that is necessary to do in charging a set of batteries is to connect a plug with any outside alternating current circuit of the proper voltage. No mistakes in charging can be made because, by the use of an automatic cutout, the batteries are taken off charge at the proper time. With this system an electric vehicle can start on a tour and have the batteries charged at any point where there is alternating current of 110 or 220 volts, doing away with the necessity of stopping at regular charging stations along the route. It becomes evident that with the apparatus installed a tour of almost any length can be made. The price of the Ellington is \$145 for Model 7, which charges 32-cell batteries, and \$170 for Model 31 for batteries of over 32 cells.



Fig. 7—This device, called the Fuel Meter, indicates the amount of fuel consumed for a given trip and also the total gallons used for a definite period. It operates on the same principle as a water meter, and being placed on the dash, the driver is in a position to tell at any time just what mileage per gallon the car is giving



From the Four Winds



TO Sell Hudson in Alaska—Roy Rutherford last week was appointed agent for the Hudson at Fairbanks, in the interior of Alaska. More than a score of machines are in use and around the far northern town.

License Tags by Parcel Post—In order to prevent any congestion of mails during the holiday rush, the state highway department of Pennsylvania has announced that it will send out the new license plates by parcel post. The license tags for the current year expire at midnight, December 31.

To Keep Track of Sales—The Indianapolis city council is considering an ordinance requiring detailed reports to be made to the police department of the purchase of second-hand motor cars, parts and accessories. The reports are to be made within 24 hours after any such purchase is made and a heavy fine to which a jail sentence may be added is provided upon conviction for violating the ordinance.

Stay on Right Side—The act of a chauffeur in contravening traffic by-laws by driving his car on the wrong side of the street will cost his employer \$4,000 as a result of a ruling in a case just dealt with by Justice Lafontaine at Montreal. The chauffeur ran down and killed a man. Because, however, the victim himself in attempting to cross the street had neglected to observe the "stop, look, listen" injunction, the award made his widow was reduced by the court from \$6,000 to \$4,000.

Toronto Has 6,000 Cars—Over 6,000 cars are registered as owned in Toronto, which is more than are numbered in many of the principal countries of the world. Few Torontonians have realized the size of this figure, which shows that this city has reached an important position in the motoring world. Toronto's total figure, according to a recent census, is equal to the number of cars owned in the kingdom of Hungary and a greater number than are owned in British South Africa, Sweden, Switzerland, Holland or Bulgaria.

Engineers Testing Road Materials—The state highway department of Pennsylvania has started a laboratory for testing of road materials and already has been benefited thereby. An appropriation for this purpose was made by the legislature of 1913. A building was leased at 421 South Cameron street, Harrisburg, and up-to-date apparatus, needed for the determining of road material stability, instituted. Thomas J. Keane, superintendent of asphaltic construction of the state highway department, and S. D. Foster, chief engineer of the department, are in charge.

Machine Guns for Canadian Troops—The president of the Bank of Montreal, H. V. Meredith, on behalf of himself, H. R. Drummond, Senator R. McKay, Arthur Drummond and C. B. Gordon, has offered to the Canadian government a sum of \$25,000 for the equipment of a quick-firing machine gun battery. Sir Robert Borden has accepted the offer and plans for the building and equipment of the motors and guns are well under way, the best talent in the United States and Canada being employed. It is understood that this battery will be similar to the one equipped by the Hon. Clifford Sifton and others for the first contingent. It will include half a dozen machine guns mounted on motor trucks with other machine guns that can be taken out and mounted on tripods for field work. Some twenty trucks altogether are

used for ammunition, supplies, ambulance, etc., besides the guns. It is understood that Edward Holland, Ottawa, who won the Victoria Cross in South Africa, will be in command of the battery.

To Mark Delaware Roads—The Delaware Automobile Association has decided to mark all of the road intersections in New Castle county, Maryland, and it has asked the county commissioners to provide the signs. About 1,200 will be required.

Many Exhibits for Columbus Show—The annual Columbus Motor show, which will be held in the Memorial hall the week starting January 30, will be under the auspices of the Columbus Automobile Club, and the Columbus Auto Trades Association. The joint committee in charge of the show consists of J. P. Gordon, chairman; Ira Madden, vice-chairman; E. B. Coats, secretary; L. M. Browne, treasurer, and M. A. Pixley. In all fifty-five different cars, including electric and gasoline pleasure cars and motor trucks, will be shown. Accessories will be displayed in the balcony.

To Tax Cars on Displacement Formula—The motor vehicle division of the state department of engineering of California announces that for the year 1915 the determination of the horsepower rating of motor cars will be based upon a displacement formula instead of as heretofore on the associated licensed manufacturers' formula. This formula requires that the stroke of the piston shall be given as well as the diameter of the bore and the number of the cylinders, while the A. L. A. M. formula required only the diameter of the bore and the number of cylinders. The displacement formula is more accurate than the A. L. A. M. formula and requires that the owners shall pay their fees

Coming Motor Events

SHOWS AND CONVENTIONS

- December 14-16-American good roads congress, Chicago.
- January 2-9-New York show.
- January 8-14>Show, Milwaukee, Wis.
- January 9-16-Philadelphia show.
- January 11-16>Show, Buffalo, N. Y.
- January 16-23>Show, Cleveland, O.
- January 16-23>Show, Detroit, Mich.
- January 18-23>Show, Rochester, N. Y.
- January 23-30-Chicago show.
- January 23-30-Montreal show.
- January 25-30>Show, Fall River, Mass.
- January 30-February 6-Minneapolis show.
- February 15-20>Show, Omaha, Neb.
- February 15-21>Show, Grand Rapids, Mich.
- February 8-15>Show, Kansas City, Mo.
- February 23-27>Show, Ft. Dodge, Ia.
- February 23-27>Show, Syracuse, N. Y.
- February>Show, Portland, Ore.
- February>Show, Toledo, O.
- February>Show, Hartford, Conn.
- March 6-13>Show, Boston, Mass.
- March 8-13>Show, Des Moines, Ia.

CONTESTS

- December 30-January 2—El Paso-San Diego road race.
- January 9—Point Loma road race, San Diego, Cal.
- *February 22—Vanderbilt cup race, San Francisco, Cal.
- *February 27—Grand prize road race, San Francisco, Cal.
- *May 29—500-mile speedway race, Indianapolis, Ind.

*Sanctioned by A. A. A.

in accordance with the actual horsepower. Within the last year a number of large manufacturers have been reducing the size of the bore, while lengthening the stroke of the cylinders, which produced a greater horsepower, but when figured under the A. L. A. M. formula it reduced the horsepower while in fact the horsepower was increased.

Club to Build Boulevard—The construction of a toll highway for motor cars from San Antonio, Tex., to Medina lake is now practically assured. The project is being promoted by the San Antonio Automobile Club. The total cost of the construction work will be approximately \$35,000 for 7 miles of highway, and a good part of this sum already has been subscribed.

Highway Maps for Quaker Motorists—The Pennsylvania state highway department has just issued a highway map of the southeastern section of Pennsylvania on which state highways as well as county and township roads are shown. Maps for the other three sections of the state are being compiled and as soon as they are prepared they will be printed and distributed.

Fire of Peculiar Origin Destroys Car—Donald P. McPherson, of Gettysburg, Pa., had a unique experience last Thursday afternoon when his motor car, a four-cylinder Cadillac, was destroyed by fire in the Blue Ridge mountains near the Buena Vista Springs hotel, close to Pen-Mar, a well-known summering resort. Mr. McPherson and his wife were on their way to Hagerstown and in descending a steep hill, the back fire of the engine set fire to the leaves and underbrush. Soon the car was in flames and all efforts to save it proved futile.

Canadian Drives 300 Miles on Ice—A 300 mile tour over the surface of lakes and rivers on ice all the way is the unique experience of J. A. Howell, inspector of fisheries at Selkirk, Manitoba. The trip was completed in his Ford car in less than 3 days of actual travel. It is possible for a motor car to run up the river to Lake Winnipeg and across the lake to Gull Harbor on the glassy covering which is considerable of a tour. Mr. Howell and his party traveled at 30 miles an hour with fine going until they ran into a storm with heavy snow and a wind that whirled the car around several times on the smooth ice, but the car was not damaged. The only other method of traversing this district is by snow shoes or sledge dogs.

B booze and Gasoline Don't Mix—Gasoline and booze don't mix in the club maintained by the Philadelphia Automobile Trades Association at Broad and Callowhill streets. A recent report of the organization for 12 months brought out some facts that establish almost a record among clubs of its kind for abstinence. The association has 150 members. Its cafe is patronized by an average of thirty-five members every day during the year. Some days seventy members are fed at the tables. Last year these members spent for luncheons a total of \$12,000 in the cafe. The booze bill for the same period was \$33. The steward reports that he has on hand some of the same liquor with which the club was stocked when it was opened, 5 years ago. Many days, he says, even when the cafe is crowded, he doesn't sell a cent's worth of liquor. The climax to this unusual record was capped last week, when an internal revenue collector came to assess the federal tax on the liquors in stock. He found that the association owed the United States government just one-quarter of a cent.



Among the Makers and Dealers



To Make Carbon Remover—The Burnox Co., West Allis, Wis., has been organized by Theodore Mueller, Paul Hunt and Charles E. Kubicek to manufacture and market a chemical compound for removing carbon deposits in internal combustion engine cylinders.

Asks for Hassler Receiver—Adrian Hamersly, president, has brought suit in the superior court at Indianapolis asking the appointment of a receiver for the Hassler Shock Absorber Sales Co. on the ground that the concern is insolvent and owes him \$1,435.90.

To Market Glass-Fastening Device—William G. Keuter, Sheboygan, Wis., is preparing to engage in the manufacture of a new fastener for window panes for various purposes, including glass in windshields, closed bodies, etc. He has been granted patents on the device. The frame fastener is composed of a zinc alloy and so designed that replacement of glass panes is a matter of a few minutes. The trade name of Keuter metal pane fastener has been adopted.

New Bedford Had a Show—The motor dealers of New Bedford, Mass., had a motor show last week at the state armory, which was attended by large crowds every evening from Monday until Saturday. It was under the management of Stephen D. Pierce, proprietor of the Knickerbocker garage. The members of the militia companies using the armory divided the proceeds with the motorists. There were twenty different makes of gasoline and electric cars exhibited.

Tire Plant at Bucyrus—Eastern Ohio and Pennsylvania capitalists have closed a deal with local interests to convert the idle plant of the old Bucyrus Steam Shovel and Dredge Co. of Bucyrus, O., into a tire manufacturing plant. Work of remodeling the plant will begin at once, and it is expected to be employing 1,000 hands by January 1, 1915. The plant was vacated when the dredge company moved to South Milwaukee a quarter of a century ago and has been idle ever since.

Settle on 20 Per Cent Basis—The proposition made by the Universal Machinery Co., 1916 St. Paul avenue, Milwaukee, to make a composition of claims against the bankrupt estate on the basis of 20 per cent has been accepted by a majority of creditors whose claims have been filed and allowed. At this time it is not known if the business can be rehabilitated and operations resumed, although this is the intention of a number of interested people.

Hoosiers on New Tack—The first of a series of winter entertainments was given on the evening of December 3 by the Hoosier Motor Club, Indianapolis. The entertainment included a spectacular presentation of a revival of the motor industry, in which business receiver, inefficiency, cut price, free service, overhead, yearly model and mistrust were driven away by characters representing full price, ample capital, paid service, efficiency, economy, series construction and confidence.

Motor Equipment Company Reorganized—The Hans Motor Equipment Co., La Crosse, Wis., one of the largest producers of pressure and capacity gauges, oil pumps and other motor car parts and accessories in the middle west, is undergoing a financial reorganization under the direction of Dan W. MacMillan, of La Crosse, in favor of whom the concern has executed a trust deed. The company has a current indebtedness of about \$18,000 which will be liquidated at once. It

moved to La Crosse and built a new factory with the assistance of the La Crosse Industrial Association about 2 years ago, and the reorganization is meant to place the concern on a sound footing for the future. It is stated that the company is in good condition, having materials on hand valued at \$30,000, fully paid for, and machinery, tools and equipment appraised at \$50,000.

Verbal Order Holds—A word of mouth agreement made on May 27 Judge Middleton has decided was sufficient to bind Donald Fraser to purchase a Cadillac from the Peerless Garage Co. of Ottawa, Ont. Because Mr. Fraser had accepted delivery of the car and had taken a run in it, the judge gave a de-

cision in favor of the garage company which sued Mr. Fraser for the price of the car. The judge said the contract was completed without any written agreement. When the counsel for Mr. Fraser demurred at this, Judge Middleton reminded the lawyer that one does not have to sign a contract to complete the purchase of a pair of shoes.

Charter Boat to Ship Maxwells—A few days ago the Maxwell Motor Co. chartered the White Star Line steamer Wauketa to carry fifty Maxwell cars from Detroit to its Toledo distributor, Landman & Griffith. It is claimed that this is the first time that an entire boat load of motor cars have been shipped by one concern.

Tire Factory to Be Reopened—W. A. Himbaugh, president of the board of trade, states that negotiations are pending with out-of-town interests which will result in opening of the local plant of the S. & M. Tire and Rubber Co. at an early date at Coshocton, O. The necessary capital is understood to have been raised and arrangements are now in progress to buy new machinery for the plant. Mr. Himbaugh says 100 men will be employed.

New Top Concern—The National Car Equipment Co. has been incorporated at South Bend, Ind., to manufacture top covers and upholstering. The capitalization is \$20,000. Frank J. Cosgrove of Chicago is president and Norman Roos of South Bend vice-president. According to Mr. Cosgrove the company has taken over the Topeka Auto Trimming Co. and has moved the equipment to South Bend on account of better shipping facilities offered. The concern started operations with a force of twenty-five men.

Produces Gang Valve Grinder—Forrest E. Devine, Madison, Wis., inventor and patentee of a gang grinder for reseating valves in poppet-valve engines, by means of which all of the valves of a multiple-cylinder engine may be ground at one time, is preparing for a large production of the appliance. The Devine valve grinding machine is designed primarily for garage use and its distribution for the present will be through the jobbing trade only.

Lamp Company in Kissel Plant—The Westinghouse Lamp Co., of New York, a subsidiary of the Westinghouse Electric Co., has commenced operations in its new western plant at Milwaukee, Wis., purchased some months ago from the Kissel Motor Car Co. of Hartford, Wis., upon abandonment of the Kissel company's Milwaukee factory. The new Westinghouse plant will have an output of 600,000 Mazda lamps monthly, and it is said a considerable share of these will be low-voltage lamps for motor car purposes. The plant consists of five large buildings and is located at Thirty-first and Center streets.

Oxygen Company to Double Output—The Universal Oxygen Co., Sheboygan, Wis., which established a plant for the production of gas for concerns operating welding and cutting apparatus about 8 months ago, is preparing to double the output. For 2½ months the plant has been working day, night and Sunday shifts and the monthly production of gas has reached nearly 90,000 cubic feet. This is being shipped in steel drums to all parts of the country. Until recently the supply of containers was derived from Germany, but this has now been stopped by the war and in doubling the size of the gas producers, the company is planning to add a machine shop for the manufacture of drums.

Recent Incorporations

Albany, N. Y.—C. B. & H. Co., capital stock \$50,000; to manufacture motor cars; incorporators, F. T. Harbach, J. H. Pease, F. W. Ritter.

Albany, N. Y.—The Greene Motor Co., capital stock \$6,000; incorporators, G. Posner, A. A. Schwartz, J. M. Greene.

Albany, N. Y.—The Protectyre Co., capital stock \$20,000; to manufacture tire protecting devices; incorporators, A. Alexander, H. J. Rosenblum, L. Neustaedter.

Albany, N. Y.—The Rolls-Royce, Ltd., capital stock \$1,000,000; to deal in motor cars; incorporators, P. S. Jones.

Columbus, O.—Bucyrus Rubber Co., capital stock \$150,000; incorporators, G. M. Smith, J. Taylor, H. B. Stewart, E. L. Smith, I. H. Taylor.

Dayton, O.—The Bates Motor Car Co.; capital stock \$10,000; to deal in motor cars and accessories; incorporators, O. E. Bates, E. G. Bates, C. E. Bates, A. M. Gebhart, J. C. Schneffer.

Gouverneur, N. Y.—The Spooner-Campbell Co., capital stock \$40,000; to deal in motor cars; incorporators, A. F. Spooner, V. S. Campbell, E. W. Campbell.

Harrisonburg, Va.—Harrisonburg Auto Transportation Co.; capital stock \$20,000; to deal in motor cars; incorporators, A. M. Graves, H. M. Effinger.

Lions, N. Y.—Barrick-Jennings Co., capital stock \$15,000; incorporators, E. J. Barrick, C. W. Barrick, J. E. Jennings.

Manhattan, N. Y.—W. H. Cahn, capital stock \$10,000; incorporators, W. H. Cahn, J. H. Hobbs, T. J. Carty.

Montreal, Canada—The Aztec Oil & Asphalt Refining Co., capital stock \$2,000,000; to deal in oil.

Mt. Vernon, N. Y.—The Albert Garage, Inc., capital stock \$10,000; to deal in motor cars and accessories; incorporators, P. E. Hendrick, M. C. Hendrick.

New York—Greene Motor Trucking Co., capital stock \$6,000; incorporators, J. M. Greene, A. A. Schwartz, Gustave Posner.

New York—Lansden Company, to manufacture electric motor cars; capital stock \$1,000; incorporators, M. Lippman, E. Ullmann, E. L. Meyer.

New York—Mutual Motor Sales Co., capital stock \$25,000; incorporators, G. Ozanne, W. P. Buckler, J. B. Kalmuk.

New York—Reliable N. Y. & Brooklyn Auto Delivery Co., capital stock \$1,000; incorporators, Chas. Cohen, L. B. Carhart, D. Katzman, Nant. W. Smith, H. B. Mook.

New York—The Aero-Cushion Tire Co., capital stock \$750,000; incorporators, J. A. Le Daux, F. Rause, G. A. Le Daux, W. S. Locks, W. L. Biddle, M. C. Callius, E. M. Orive.

New York—Denby Motor Truck Co., capital stock \$20,000; to manufacture motor cars and accessories; incorporators, S. L. Storti, J. H. Sharkey, W. I. Cohen.

New York—Hicks & Watts, capital stock \$10,000; to manufacture motor cars; incorporators, E. R. Heger, J. Watts, C. N. Hicks.

New York—The Lansden Co., capital stock \$1,000; incorporators, M. Lippman, Emma Ulman, E. Manuel, L. Meyer.

Oshkosh, Wis.—Paragon Oil & Supply Co., capital stock \$15,000; incorporators, E. L. Thompson, T. F. Coffey, E. Thompson.

Oklahoma City, Okla.—Paige Motor Car Co., capital stock \$8,000; incorporators, J. T. Wheatley, W. H. Crane, J. L. Daniel.

Providence, R. I.—Alfred O. Poirier Co., to deal in motor cars; capital stock, \$30,000; incorporators, F. Poirier, J. H. Malpolt, A. Moreau.

Portland, Me.—General Transit Co., to deal in motor cars and do a general transportation business; capital stock \$1,000,000; incorporators, E. E. Noble, E. V. Mann.



Brief Business Announcements



OWOSSO, MICH.—A garage has been opened here by Fred Marquette.

Hillsboro, O.—H. D. Sewell & Co. has opened a repair shop and garage in connection with the electrical supply business.

San Francisco, Cal.—Marc Bunnel hereafter will represent the Chalmers Motor Co. on the Pacific coast, with headquarters at San Francisco.

Detroit, Mich.—Lindsay Hopkins, formerly southern representative of the Willys-Overland Automobile Co., has been appointed general manager of the Atlanta Cadillac Co., Atlanta, Ga.

Boston, Mass.—The Mitchell & Smith Co. has been organized here to handle the Ford starter for eastern Massachusetts instead of having the factory put out the equipment. The company has secured salesrooms and an equipment plant at 1092 Commonwealth avenue.

Dayton, O.—Edgar Daniels, doing business as the Daniels Auto Supply Co. at Dayton, has filed a petition in voluntary bankruptcy in the United States district court at Cincinnati. He has liabilities of \$3,596 and assets of \$2,883, of which he claims \$500 exempt.

Detroit, Mich.—E. J. McLaughlin, formerly sales manager of the Saxon in New York territory, has been appointed general sales manager of the Hudson-Bender Motor Car Co. of Kane, Pa., distributor of the Hudson in thirteen counties of Pennsylvania and three in New York state. It has three branches: One in Du Bois, Pa., one in Al-

toona, Pa., and one in Elmira, N. Y. A district manager is in charge of each branch.

Kalamazoo, Mich.—A garage has been opened at 313 South West street by V. A. Converse and Leo Lille.

Findlay, O.—Beck & Strait has opened a garage at Vanlue, this county, and will take on several new cars for the coming season.

Hillsboro, O.—Otto Miller and Allen Robinson, comprising the Hillsboro Auto Co., have dissolved partnership, the business being taken over by Mr. Robinson.

Columbus, O.—George G. Ruprecht, who has been connected with the Columbus Buggy Co., has formed a partnership with Thomas Murphy on Parsons avenue, under the name of Murphy & Ruprecht in the motor car painting and tire repair business.

Los Angeles, Cal.—Neiswender Bros. is the name of a new firm which has lately been formed to deal in used Ford cars and Ford accessories. The firm is composed of Chester B. Neiswender and Leland W. Neiswender and is located at 1534 West Seventh street.

Seattle, Wash.—Indicative of present prosperity and future growth is the announcement by J. W. Leavitt & Co., Pacific coast distributor of Overland cars, that two stories will be added to the corporation's plant in Seattle. The present home of the Leavitt company provides 21,000 square feet of floor space, and, with the two additional stories, there will be available a total of 36,000 square feet of room. The improvement will cost upwards of \$12,000, and will be completed by spring. The building will be of brick and

steel. The two new floors will be devoted to the rebuilding and painting of used cars.

Columbus, O.—The Columbus Welding Shop is the name of a new repair shop, located at 294 North Third street.

Los Angeles, Cal.—The local service station of the Remy Electric Co. is now conducted by the Hucks Electric Co., 627 West Pico street.

Indianapolis, Ind.—Eugene McIntire has bought the interests of C. E. Allen in the Sixteenth street garage, Indianapolis, and will conduct the business hereafter.

Louisville, Ky.—Gilbert S. Loomis, formerly department head in the sales division of the Packard Motor Car Co., Detroit, is now general manager of the Southern Motors Co., which handles the Packard, Hudson and Dodge gasoline cars and the Detroit electric.

Indianapolis, Ind.—The agency for the Master carburetor for Indianapolis and vicinity has been taken by Perry Wyatt, formerly with Horace F. Wood, who is engaged in the transfer and taxicab business. Mr. Wyatt will make his headquarters at 621 North Illinois street.

St. Paul, Minn.—H. B. Shontz has been made sales manager of the Merritt J. Osborn, Inc., West Third street, and College avenue, distributor of Overland and White cars. Mr. Shontz was formerly sales manager of the C. T. Silver Motor Co., distributor of Overland cars for New York. For the last 4 months, he has been factory representative of the Willys-Overland Co., for the state of Minnesota.

Recent Agencies Appointed by Motor Car Manufacturers

PASSENGER CARS

Town	Agent	Make	Town	Agent	Make
Beaver Falls, Pa.	G. S. Hunter	Herff-Brooks	Kingman, Kans.	Grant & Oakes	Overland
Bloomington, Ind.	Knapp & Hillary	Allen	Kansas City, Mo.	Kansas City Auburn Auto Co.	Westcott
Buffalo, N. Y.	B. F. Milson	Kisselkar	Kilbourn City, Wis.	O. E. DeWitt	Apperson
Bedford, Mass.	B. A. Vance	Kisselkar	Kilbourn City, Wis.	O. E. DeWitt	R. C. H.
Bloomingburg, N. Y.	Clapham & Hagan	Kisselkar	Lemont, Ill.	Tedens & Dystrup	Veile
Brandon, Vt.	F. R. Barker	Herff-Brooks	Lanyon, Ia.	G. T. Peterson	Kisselkar
Bowling Green, O.	C. C. Richardson	Westcott	Lake Park, Ia.	H. C. Meyer	Franklin
Bridgeport, Conn.	Minty & Royce	Westcott	Leipsic, O.	Dallas Kirk	Westcott
Brockton, Mass.	Marble Auto Co.	Westcott	Mt. Union, Pa.	Frank H. Culver	Herff-Brooks
Columbus, O.	Chas. G. McCune	Kisselkar	Montreal, Can.	Gareau Motor Car Co.	Hupp
Curtisville, Pa.	N. M. Snyder	Kisselkar	New London, Wis.	W. F. Block	R. C. H.
Champaign, Ill.	E. E. Burton	Herff-Brooks	New York	Dimond-Warren Motor Co.	Herff-Brooks
Calumet, Mich.	Michael Nampa, Jr.	Velle	New London, Wis.	W. F. Block	Apperson
Cleveland, O.	J. H. Greenwald	Chalmers	Napa, Cal.	B. M. Norton	Kisselkar
Corsieanne, Tex.	L. H. Lee	Saxon	Osceola, Ia.	Keeran & Collins	Herff-Brooks
Cuba City, Wis.	Hein Brothers	Apperson	Oak Hill, Fla.	F. P. Ziy	Westcott
Cuba City, Wis.	Hein Brothers	R. C. H.	Philadelphia, Pa.	Fanning Motor Car Co.	Marmon
Casey, Ill.	Westcott Motor Sales Co.	Westcott	Red Bank, N. J.	E. Von Kattengell	Kisselkar
Escanaba, Mich.	J. E. Jackson	Kisselkar	Richland Center, Wis.	E. A. Prouty	Ford
Fort Wayne, Ind.	D. H. Harris	Westcott	St. Louis, Mo.	Colonial Motor Car Co.	Kisselkar
Flint, Mich.	Garnet Auto Sales Co.	Kisselkar	Stoughton, Wis.	Trace Christianson	Apperson
Gainesville, Fla.	T. J. Baker	Westcott	Stoughton, Wis.	Trace Christianson	R. C. H.
Hebron, Ill.	Gates & Douglas	Velle	Sandusky, O.	H. A. Fox	Westcott
Hartford City, Ind.	Dr. A. W. Tindall	Westcott	Sandusky, Mich.	Woolman & Ferguson	Dodge
Hartford, Conn.	Hartford Garage Co.	Monarch	Toledo, O.	Bunnell Auto Sales Co.	Kisselkar
Hartford, Conn.	J. M. MacDonald Co.	Allen	Toronto, Can.	Wilson Motor Sales Co.	Franklin
Horsham, Pa.	T. W. Tyson	Westcott	Tiffin, Ia.	August Amish	Herff-Brooks
Indianapolis, Ind.	E. M. Holmes	Monarch	West Bend, Wis.	Meyer Brothers	Dodge
Indianapolis, Ind.	Conduit Automobile Co.	Stutz	Wheeling, W. Va.	H. S. Sands Electric & Mfg. Co.	Dodge
Joliet, Ill.	Joliet Motor Car Co.	Veile	Wethersfield, Conn.	J. M. MacDonald Co.	Allen
Jacksonville, Fla.	G. W. Spaulding	Kisselkar	Yorkville, Ill.	Jacob Arbuster	Velle
Kingman, Kans.	Grant & Oakes	Studebaker	Washington Hgts., Ill.	G. E. Strom	Velle

COMMERCIAL CARS

Albany, Ga.	W. L. Brown	Koehler	Hightstown, N. J.	Thomas Peppler & Son	Koehler
Clarksville, Tenn.	Clarksville Auto & Repair Co.	Koehler	Louisville, Ky.	Strube's Garage	Koehler
Cape May C. H., N. J.	Dix Auto Co.	Koehler	Lexington, Ky.	Union Motor Car Co.	Koehler
Houtzdale, Pa.	H. J. Wagner	Koehler	Providence, R. I.	Capitol Motor Car Co.	Koehler

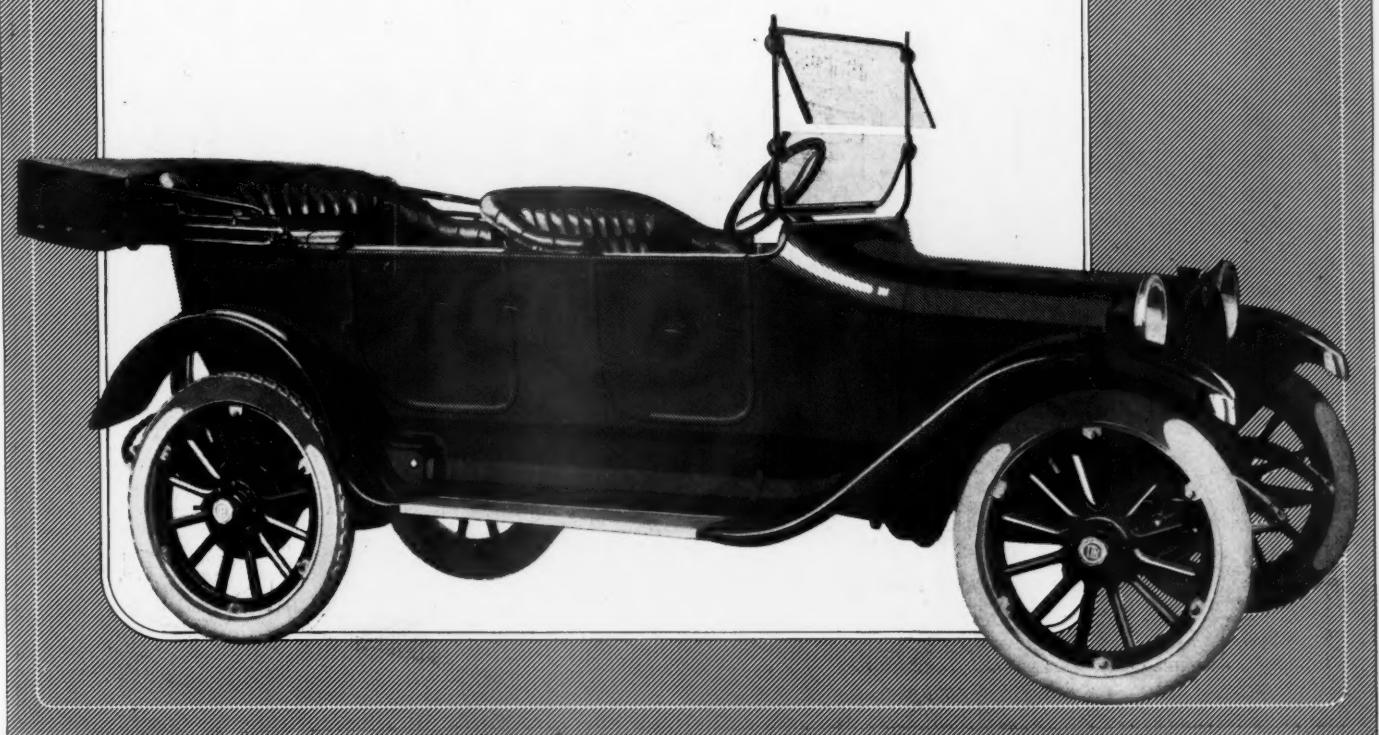
DODGE BROTHERS MOTOR CAR

You will encounter many features which exceed your expectations—never one that falls below them

Timken bearings are used throughout the car; and S. R. O. bearings in clutch and transmission.

The price of the car complete is \$785
f. o. b. Detroit

DODGE BROTHERS, DETROIT

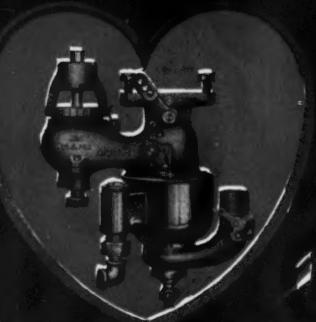


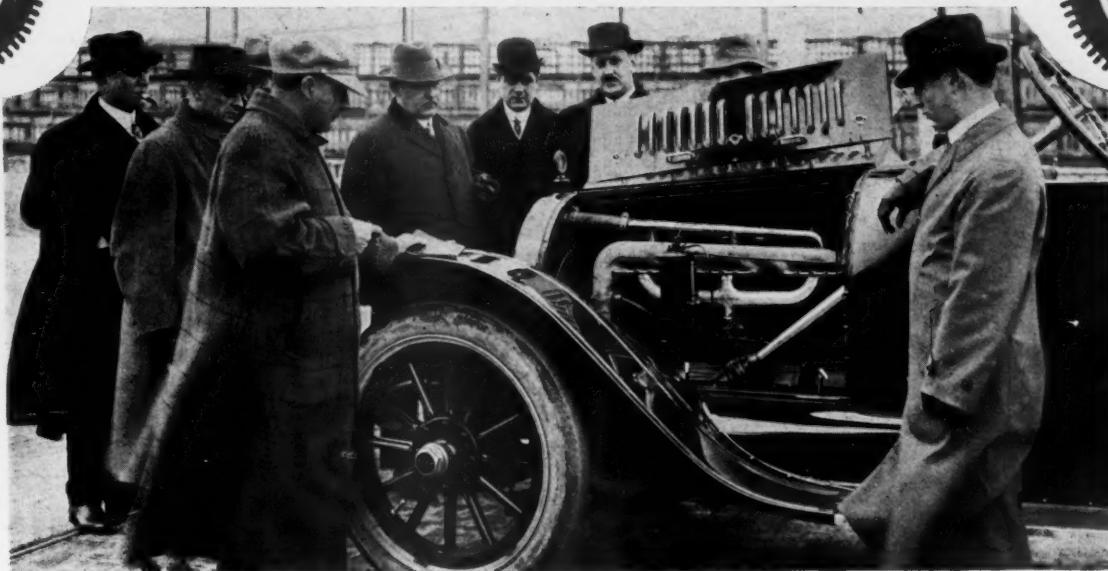


MADE IN OUR OWN
FACTORY DOWN TO
THE LAST TINY PART

“
SCHEBLER
CARBURETOR
“The Heart of the Automobile”

WHEELER & SCHEBLER
INDIANAPOLIS · INDIANA





A. A. A. Officials examining the Buick Six after the tests

Buick Model 55-C shows $12\frac{3}{4}\%$ increased mileage per gallon

at Indianapolis, December 4

when using STEWART Vacuum Gasoline System

This test, run under the sanction of the A. A. A., again proves the economical advantages which are possible by the use of this new System. The even flow of warmed gasoline to the carburetor in no way affects the correct working of the carburetor. The gasoline which Air Pressure Feed Systems force through the carburetor wastefully upsets the carburetor adjustment, causing carbonization and a sluggish motor.

This Stewart Vacuum System allows the carburetor to be mounted close up against the intake manifold, where it is more accessible, while the heat from motor assists carburetion. The supply of gasoline, always remaining in the Stewart tank, retains the heat and makes starting much easier, thus conserving excessive drain on the batteries.

Says the editor of one of the leading Automobile Weeklies—"It is seldom that a radically new product meets with the wide adoption which has been accorded to the Stewart Vacuum Fuel Feed System. Unheard of a year ago, it is now used on 25.6% of the cars."

Can be put on any car, old or new, by any garage man

Stewart-Warner Speedometer Corporation
CHICAGO, U. S. A.

Cole Car makes from 17
to 22 per cent gain, using
Stewart System

In a test sanctioned by the A. A. A. a Cole car equipped with the finest possible pressure feed gasoline system made 20.82 miles on a single gallon of gasoline. The identical car was then equipped with a Stewart Vacuum Tank, and under the same precise conditions went 24.42 miles per gallon—over 17% increased mileage per gallon. Another Cole car equipped with a Stewart Vacuum Tank showed an increased mileage per gallon of slightly over 22%.

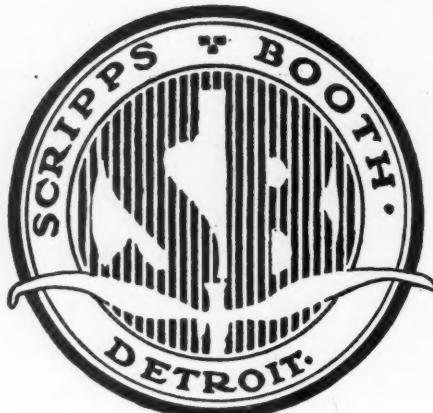
Mitchell "Reliability" Car uses
Stewart System on 7518-mile
sealed bonnet run

In the phenomenal run of the Mitchell Reliability car which made 7518 miles in 30 days, the Stewart Vacuum Tank was under the sealed bonnet and required absolutely no attention. To equip this Stewart Vacuum Tank on a car that was to undergo the most hazardous test any automobile was ever put to, shows the faith that the Mitchell people had in it—a faith that was justified by its wonderful performance.

Marmon "41" makes wonderful records, using Stewart Vacuum System

The Marmon "41," which made its wonderful 1030-mile run on the Indianapolis Speedway, using the new synthetic fuel made from rain water, was equipped with the Stewart Vacuum Gasoline System. The distance was covered in about 18½ hours—averaging nearly 56 miles an hour. No better test could be made as to the efficiency as to furnishing a perfect gasoline feed under any and all conditions. There are no conditions whatsoever in which this Stewart Gasoline System has failed to perform with equal success.

SCRIPPS



BOOTH

Luxurious Light Cars



SCRIPPS BOOTH ROADSTER, \$775

SPECIFICATIONS:

110-inch wheelbase, three passenger car.

MECHANISM

Four-cylinder motor, three-speed gearset, shaft drive, bevel gear rear axle.

EQUIPMENT

Absolutely complete from electric self-starting and lighting system to electric door locks.

FINISH

Finest possible, both as regards upholstery, instruments, dash equipment and body finish.

DETAILS

Body—Streamline, torpedo stern, highest grade blue-black finish, domed fenders. **Upholstery**, finest quality long-grain buffed leather. **Cowl dash instruments**; sight feed oiler, lighting and dimming switches, starting strangler, starting and ignition switch, flush type speedometer, generator indicator, shroud light and foot space light.

WHEELS

Five Houk, triple-laced detachable wire, 30x 3½ inches, wide hubs.

AXLE

Rear, full-floating, annular bearings throughout. Bevel drive. Ball bearing universal joints on the Kardan shaft. All gears and shafts 3½% nickel steel. Drive shaft tubular.

DISTINCTION

in a motor car is expressed in beauty and elegance of body line and equipment or in exclusive luxury of road comfort.

P R I D E

only is had in a car which is distinctive as compared to its neighbor; different in its performance and showing taste and good judgment on the part of its owner.

SCRIPPS-BOOTH luxurious light cars are distinctive in appearance, luxury, equipment and comfort; light weight motor vehicles in which the most fastidious and exacting big car owner may take pride as an additional ornament to the floor of his garage.

No big car equals the riding comfort of this Scripps-Booth light weight vehicle of luxury under all road conditions.

The price is consistent with the highest possible quality of design, material and workmanship.

SCRIPPS-BOOTH CO.
DETROIT

SPECIFICATIONS:

MOTOR

Sterling, valve-in-head type, high speed, gearset in unit, pump feed oiling with sight feed on dash, 2½ bore, 4-inch stroke, four-cylinder, water cooled. Develops 18 horsepower. Fitted with Zenith carburetor and Atwater-Kent automatic spark advance, connected with starter generator system.

STARTING

Bijur single unit electric, connected by silent chain, operated by locking dash switch.

SPRINGS

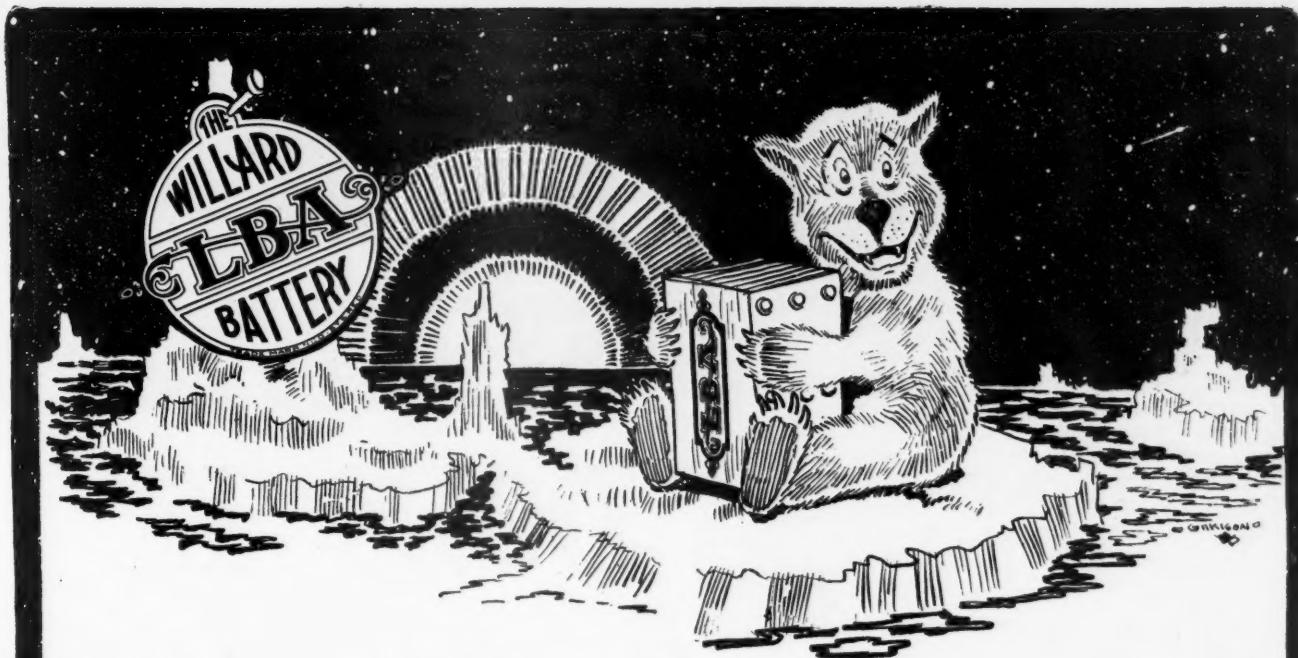
Front, semi-elliptic with over-slung frame. Rear, floating cantilever.

EQUIPMENT

Silk mohair top with side curtains, rain vision plate glass windshield, electric door lock, Klaxet horn, full tool equipment, jack. Luggage space at the rear large enough for two suit-sases and tools. Spare Houk wheel, tire and tube on all cars.

FEATURES

Klaxet button in center of steering wheel cannot be operated when ignition switch is off, eliminating miscellaneous horn blowing while the car is standing. No projecting handles or slots in the doors. Electric door locks are operated by pressing a small push button.



It's a Bear!

Polar bears and LBA batteries never mind the cold—they're built to withstand it—their hearts are strong, their blood is warm and their coats are heavy.

Weak, poorly nourished batteries, are like snakes when the mercury drops so do they, into their holes where nobody ever sees them or hears of them again till warm weather.

It's gratifying to press a self-starter when the temperature is at zero and have the motor turn over readily. An LBA is an all-year-round battery—a box full of electrical "pep" for the motorist who cares.

Willard Storage Battery Company Cleveland, Ohio

NEW YORK: 228-30 W. 58th St. DETROIT: 736-40 Woodward Ave.

CHICAGO: 2524-30 S. Wabash Ave. SAN FRANCISCO: 821 Monadnock Bldg.

INDIANAPOLIS: 318 North Illinois Street

SERVICE STATIONS IN ALL PRINCIPAL CITIES IN THE UNITED STATES,
CANADA AND MEXICO

Record
Economy Test

**28 $\frac{7}{10}$ Miles on One
Gallon of Gasoline
58.8 Ton Miles
Jeffery
Six**

NEW STROMBERG DOES IT

Five Great Records

The New Stromberg Carburetors have recently demonstrated their superiority to all ordinary Carburetors by making WORLD RECORDS in Gasoline Economy—Power—Speed—Flexibility and Acceleration—Read the results of these great tests given here.

These were made under adverse weather conditions—cold and windy—out in the open—under conditions such as you encounter in operating your car every day.

They point conclusively to the fact that it will pay you to install a New Model Stromberg on your car—and so get all the efficiency and service out of it.

Record
Speed Test

**62.8 Miles
in 60 Minutes
Constant Running
Marmon Small
Six**

Record
Economy Test

**29 Miles on One
Gallon of Gasoline
56.9 Ton Miles
Overland
Model 80**

**Record
Economy Test**

**24 $\frac{1}{8}$ Miles on One
Gallon of Gasoline
Runs 55 Miles Per.Hr.**

Cole Four

**Record
Hill Climbing
Test**

**Haynes Light
Six**

JEFFERY SIX

In an official test this car, which, with five passengers, weighed 4,100 pounds, equipped with a new Stromberg Carburetor made the remarkable record of 28.7 miles on one gallon of gasoline, or 58.8 ton miles.

HAYNES LIGHT SIX

Equipped with a New Model Stromberg demonstrated its power in the Pittsburgh hill district when it climbed hills on high without loading or overheating. With the car and passengers weighing 4,390 pounds running from 2 M.P.H. in high gear it was speeded up to 42 M.P.H. in 200 feet.

Speed and Rain Water Test

On Marmon Model 41

The wonderful test made on the Marmon Model 41 at Indianapolis was made possible by the fact that the car was Stromberg equipped. First in the speed test the car with top and wind shield up carrying five passengers, made the remarkable record of 62.89 **MILES IN SIXTY MINUTES** on gasoline. Using the new fuel and driven a distance of 1030 miles in twenty hours and thirty-two minutes, averaging 50.2 miles per hour, it was demonstrated that the new Stromberg Carburetor acted as well with the new fuel as with gasoline.

Send Us Your Name

Also the name and make of your car and we'll tell you which new Model Stromberg will get the most out of your car for you.

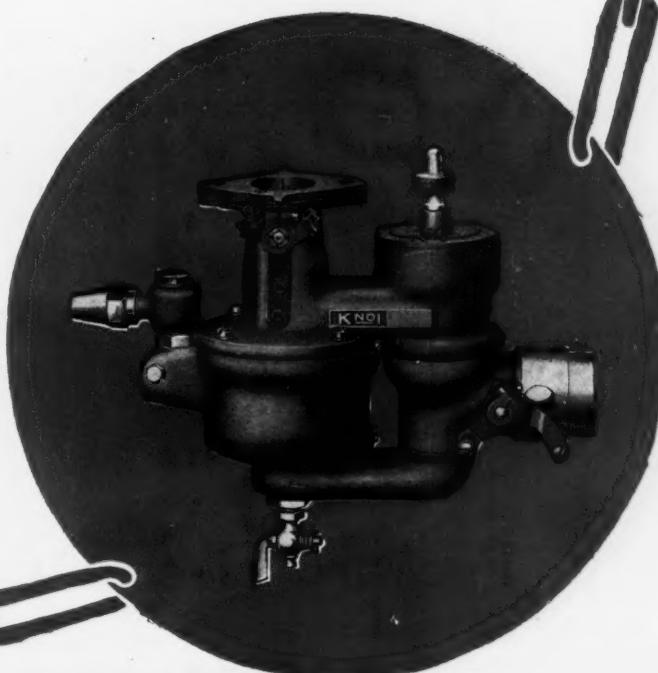
Stromberg Motor Devices Company
64-68 East 25th Street, Chicago

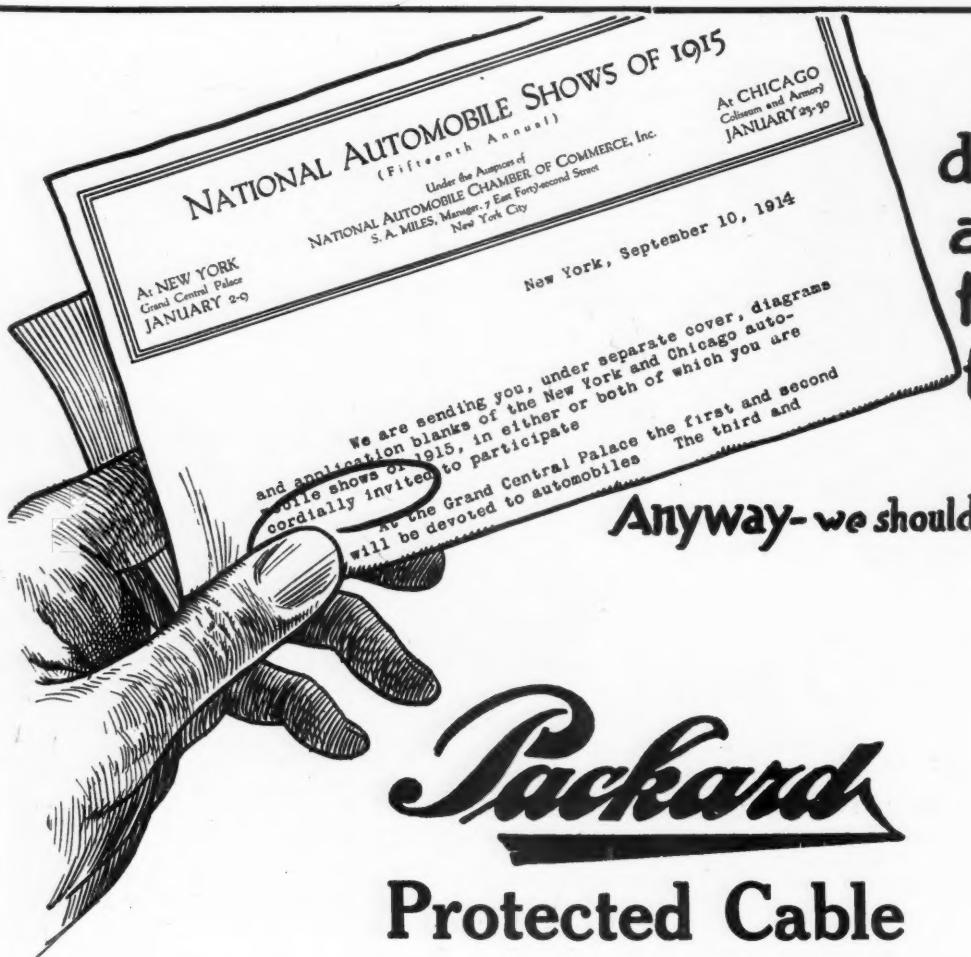
OVERLAND 80

Carrying five passengers, total weight 3,930 pounds, this car equipped with a new Stromberg Carburetor, in an official A. A. A. test with one gallon of gasoline, went 29 miles, or 56.9 ton miles.

COLE TOURING CAR

Four cylinder stock car carrying seven passengers which, with the car weighing 4,390 pounds and being equipped with a New Model Stromberg, traveled 24.135 miles on one gallon of gasoline. In a thirty minute speed test this car averaged 55.63 miles an hour.





We
didn't get
an invite
to exhibit at
the big shows

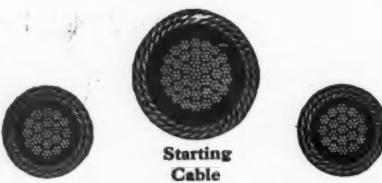
Packard

Protected Cable

**does its exhibiting in actual service. Besides,
if you are at the shows and want to see our
cable, you'll find it on many of the best cars.**

Automobile Shows give Packard Protected Cable no chance to demonstrate its quality. There is no way of showing how it stands up under the injurious action of oil—how it retains its "life" in spite of heat and vibration.

Dependable service, year in and year out, on thousands of cars, is Packard Cable's "exhibit"—and this service demonstration is going on *all* the time. We make 28 standard styles of ignition starting and lighting cables. Send for circular.



The Packard Electric Co., Dept. C Warren, Ohio

(105)

\$1085



The Points of Contact

When you deal with the Regal—become one of our organization—these are the men who take care of your wants—these are "The Boys." They are the men at the "Points of Contact." They represent the Regal—they are the Regal, and you couldn't be in better hands—every one of them will do his utmost for you. They are—

The Organization Behind the Car

THE SIX REASONS

1. *The Car Itself*
2. *The Organization Behind the Car*
3. *The Advertising*
4. *The Sales Promotion*
5. *The Regal Service*
6. *The Proposition to Dealers*

These are the men who, for eight years, have been building the car of popular demand, aided by our three million dollar company and ten acre factory. Your parts-service—your sales help—your shipments—your advertising—your enthusiasm—the "pep" and "ginger" all come from them.

GET IN TOUCH—They are *live wires*—they'd make a sleepy Hoosier school boy a good dealer. These keen, resourceful business builders will work with you and for you—starting the Golden Harvest your way and help you become the *biggest dealer* in your town.

GET THE CONNECTION—You'll feel the Regal ginger "juice" tingling your blood when you say the word. Procrastination is the thief of time, so **REGALIZE AT ONCE AND REALIZE** your profits by selling a car the public demands.

REGAL MOTOR CAR CO.

302 Piquette Ave., Detroit, Mich.
Canadian Regal Motors, Ltd. Berlin, Ont.

F.L.PIERCE
SALES MANAGER

REGAL



What Is Value in a Motor Car?

Some cars are sold to some people because of the name plate. The kind of quality that the hard headed American buys takes nothing for granted. Some folks pay five thousand dollars presumably for five thousand dollars' worth of quality motor car.

In reality they pay that sum for the privilege of riding behind a certain name plate—they take it for granted that their money's worth of quality is there.

To Pathfinder owners—those who know what it stands for—the Pathfinder name plate means just as much as any name plate on any motor car.

The difference is that the quality of the car has not been taken for granted by the buyers and we never want it to be.

Pathfinder cars are built for the man who dares to enjoy the very best of everything even though he is shrewd enough to find it at a price somewhat less than his neighbor pays.

Pathfinder cars are built for the man who is not satisfied with the quality he finds in the so-called "popular priced cars," and he is not influenced to buy on price alone.

That accounts for the power plant—Continental Motor—for Timken axles, imported bearings, Parish heat treated frame, Spicer universals, Gemmer steering gear, Westinghouse lighting, starting and ignition system, Brown-Lipe four speed transmission, dry plate clutch and Golde one man top.

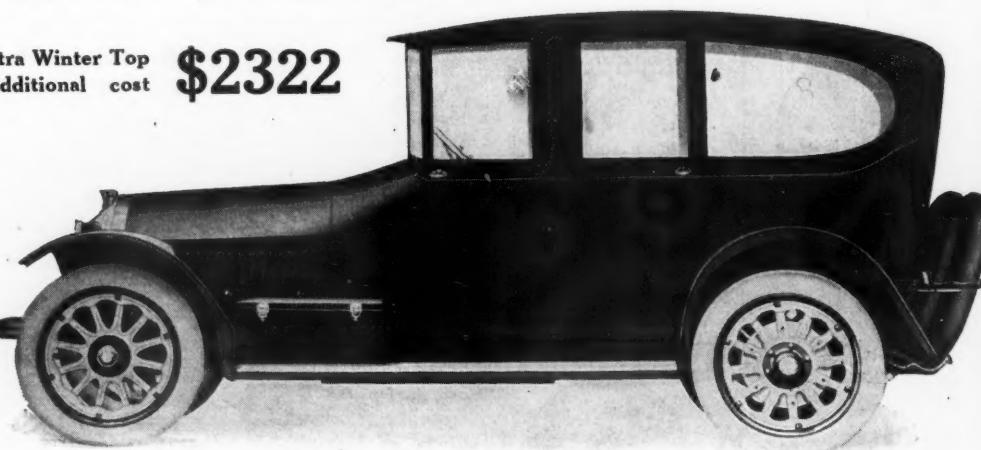
That accounts for the strong wheel construction, the double springs in the Vawter-Turkish upholstery, the oversize tires, the cantilever springs, and the many smaller but very important points throughout the car. These things constitute value in a motor car to the man who knows quality and who dares to buy it at the best price the market affords.

PATHFINDER

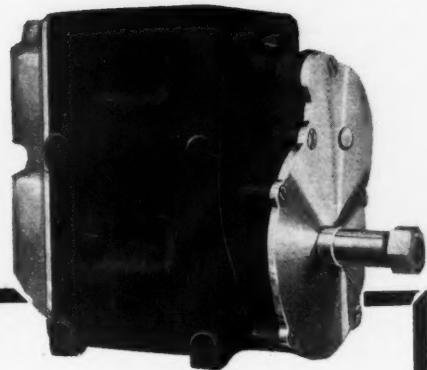
Daniel Boone Model. Extra Winter Top
as shown at small additional cost **\$2322**

Roadster, touring and
Berline bodies, five, six
and seven passenger
types, at slightly vary-
ing prices.

DEALERS will find
lots to interest them in
our 1915 plans. We
shall require additional
representation, and we
have a very interesting
proposition for the deal-
er. One of the big
things in our business
is the thorough way
that we protect and co-
operate with Pathfinder
representatives.



The Motor Car Mfg. Company, Indianapolis, Indiana



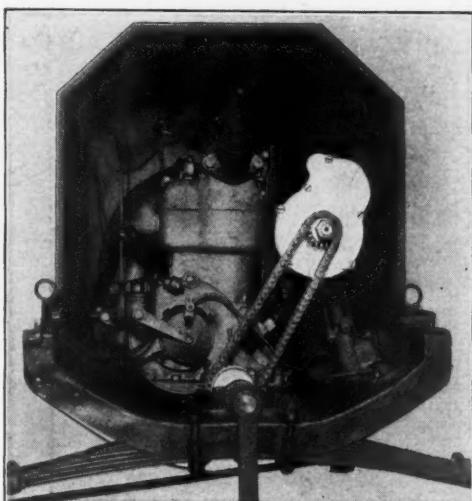
Note These Features

MOTOR and generator combined in a self-contained unit. These two machines, each of the highest efficiency and designed to perform but one function, are confined in a steel housing of great rigidity.

In operation this system is absolutely noiseless, in weight the lightest. Attached without machine work, without disfiguring car by external projections or trappy appliances.

12-volt, 3-wire system, 6-volt lamps. 47 lbs. weight.

But one connection between the lighting and starting unit and the Ford engine—made by means of a silent chain operating on two sprockets. The motor cranks the engine at a ratio of 20 to 1. No drag on the Ford engine. No reduction in power. Neither roller nor ball clutches used.



Note simplicity of mounting on Ford Cars

DEALERS

500,000 Prospective Purchasers

THREE are over 500,000 Ford owners. Every one of them is a live prospect for satisfactory guaranteed starting and lighting equipment. Sales are limited only by your aggressiveness and the number of Ford motorists in your vicinity.

Ford owners are already sold on the proposition of ELECTRIC lighting and starting. The only question is which is the best system for you to sell and for them to buy. Thorough investigation will convince you that system is the

FISHER STARTING & SYSTEM LIGHTING for FORD CARS

Why best for the dealer—best for the consumer? Because it is built by electrical experts of 30 years' experience—built especially for Ford requirements. It is not an experiment in any particular.

Our Guarantee Protects You!

It is as absolutely trouble-proof as a piece of electrical apparatus can be. It is not in the habit of coming back to feed off the dealer's profits, but stays sold. It is covered by the same broad and generous guarantee that covers all FISHER products.

Price Complete \$120

We have a dealer's proposition of unusual interest. Write for it. Some excellent territory open to the right representatives. We also make Lighting and Starting Systems adapted to any make of car. Write for catalog and prices.

Fisher Electrical Works

Makers of Electrical Apparatus for 30 Years

1500 Larned Street W.,

Detroit, Mich.

Analyze Your Market Before You Attempt to Sell It

You know what you have to sell—you know your prices must be consistent with the quality of your goods.

Your greatest problem is not production—not competition—not conditions. It is distribution—publicity—**ADVERTISING** your product.

A clear analysis of your market will enable you to administer the force of advertising most effectively and most economically.

The Class Journal Company has provided the Automobile Industry with a means of reaching each of the four classes of people who make up your market.

The Automobile
(New York)

reaches the engineers, car makers, expert mechanical and technical motorists, dealers.

Motor Age
(Chicago)

reaches the sportsmen motorists, well posted and influential owners, dealers.

Motor World
(New York)

reaches all the worthwhile dealers, jobbers, technical car owners, distributors.

Motor Print
(Philadelphia)

reaches over 40,000 non-distributors.

Each of these publications is the leader of its kind—editorially and in point of circulation.

Each of these four classes of people has a distinct and definite interest in the automobile industry and its various branches. They have asked to have your message come to them each week.

THE CLASS JOURNAL COMPANY

New York

Chicago

Philadelphia

Cleveland

Detroit

ATWATER KENT



On November eighteenth, Nineteen Fourteen, the City of Philadelphia - acting through the Franklin Institute of the State of Pennsylvania - awarded the John Scott medal to

Arthur Atwater Kent
for his improvements in Ignition devices

The seal of approval has already been placed on Atwater Kent Ignition by more than a hundred thousand enthusiastic owners of Atwater Kent equipped cars.

ATWATER KENT MFG. WORKS
Philadelphia, Pennsylvania

Is There
Anything
 You Don't Know
 About
 Automobiles?

25

Regular Price, \$2.50
 Special Price, \$1.25

"THE AUTOMOBILE CATECHISM" (de luxe edition) is a complete course in automobile instruction—every subject discussed and illustrated so that YOU will grasp every point worth while—every bit of mystery is made as simple as A B C. You are interested—you are instructed—you are directly benefited. Its information is final.

THE CLASS JOURNAL COMPANY It's a handsome piece of book work—splendidly printed, with 101 illustrations; flexible black leather binding, rounded corners and gold-edged pages—beautiful, while being intensely practical.

900 S. Michigan Ave., Chicago, Ill.
 231 W. 39th St., New York, N. Y.

Gentlemen:
 Enclosed please find \$1.25, for which send me a copy of "The Automobile Catechism" (de luxe edition). We want every reader of Motor Age to have a de luxe copy of "The Automobile Catechism." To make our offer irresistible we have decided, FOR A LIMITED TIME ONLY, to CUT THE PRICE IN TWO. This half price (\$1.25) will prove the best investment you ever made. Remember, this is the de luxe edition—264 pages—every page full of real, money-interest value.

Put your name and address on the corner coupon, tear from the page, enclose \$1.25 and mail today to—

Name

Address

THE CLASS JOURNAL COMPANY

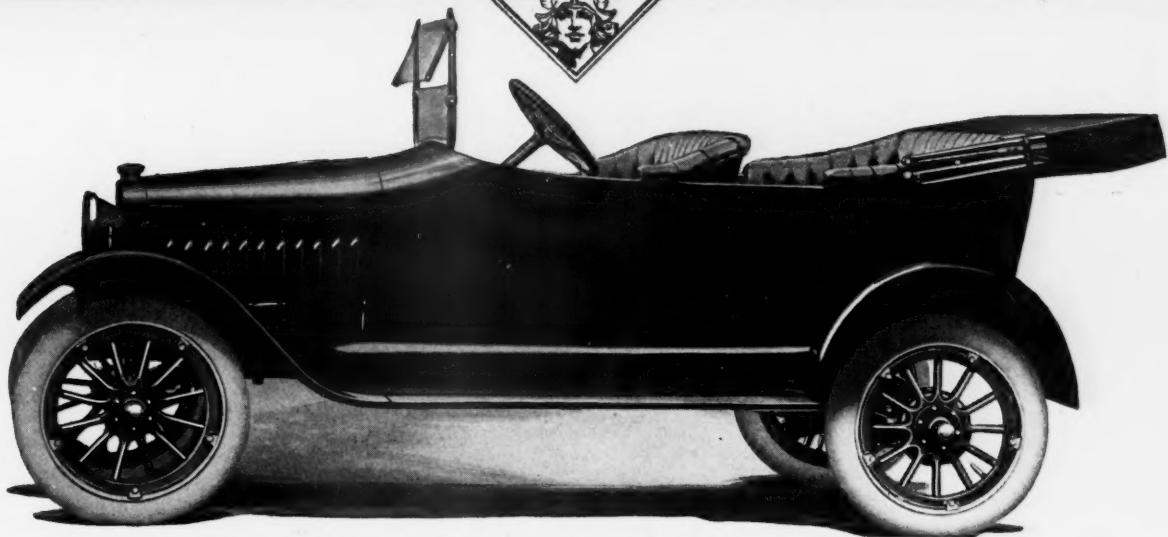
900 S. Michigan Avenue
 Chicago, Ill.

231 W. 39th St.
 New York, N. Y.

(2)



53



SAXON "SIX" \$785

SPECIFICATIONS

Body—Full five-passenger capacity, streamline type, graceful and pleasing to the eye. Only one car under \$1250 has equal inside width of tonneau seat; none has more.

Motor—Six-cylinder, long stroke, L-head type, water cooled, develops 35 h. p. on block test.

Transmission—Three speeds forward and reverse, on the rear axle.

Clutch—Dry plate, same design as high priced cars and constructed of very best materials.

Ignition—Atwater Kent system, thoroughly proved.

Springs—Modern cantilever type of vanadium steel, found elsewhere only on high priced cars. Provide unusual riding steadiness and comfort.

Tires—32 "x3½"; wheels of best grade hickory; demountable rims.

Wheelbase—112 inches. No car below \$1250 with equal wheelbase.

Frame—4½"x1½"x⅛", best grade 25-point carbon steel, deep channel section. Unusually staunch, and provides excellent foundation for body.

Axles—Front, I-beam forging; Rear, three-quarter floating type, with full Hyatt bearing equipment throughout.

Starting and Lighting System—Gray and Davis electric type. Battery that goes with it as good as money can buy.

Tread—Standard or 60 inch.

Shipping Weight—Approximately 1950 pounds.

Equipment—One man top, speedometer, two-piece rain vision windshield, extra demountable rim, foot and robe rails, electric horn, license brackets, tools.

Price—\$785, f. o. b. Detroit.

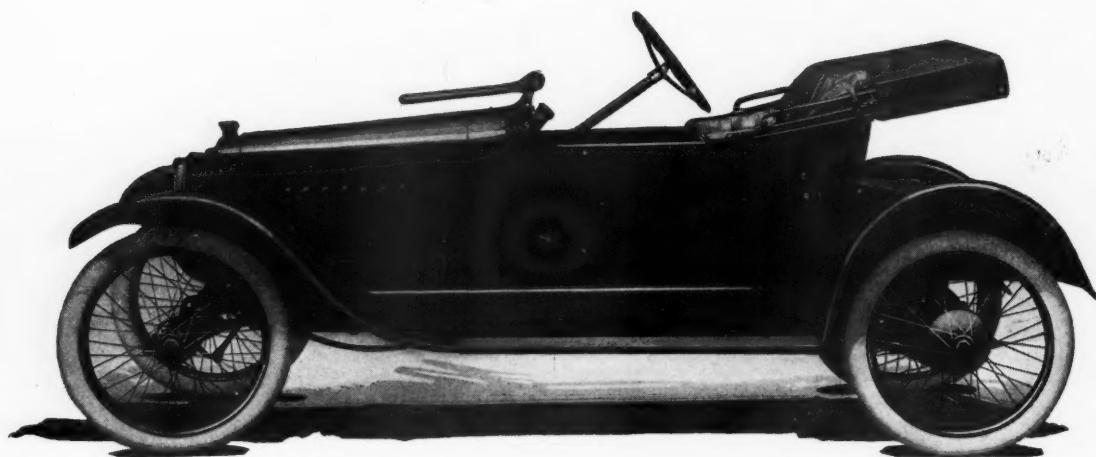
Dealers—We are now showing this car at our factory in Detroit and making contracts for next season. Write or wire if interested

Saxon Motor Company, Detroit

The Saxon "Six" Will Be Exhibited at the Motor Shows. Don't Miss It



SAXON ROADSTER \$395



Demand for 2-Passenger Saxon Compels Increased Output

LAST year the Saxon Company built and delivered more cars than any other company ever built in its first year in business.

Therefore the popular Saxon Roadster will be continued for 1915. Because of the success of this model; because of its record for standing the "gaff" and making good with owners, and because of its wide usefulness among people of all classes who want a good-looking, modern car of rock-bottom economy, production of this Saxon model will be greatly increased.

Finds a Big Market

Not only has the Saxon Roadster found a big market, but it has made some remarkable records that stamp it as dependable as high priced cars—and *more economical* in operation cost than any automobile built.

Thousands of Saxon owners average 28 to 36 miles per gallon of gasoline; 75 to 100 miles per pint of oil; 3500 to 5000 miles on a single set of tires. In public tests Saxon efficiency and economy have been proven by the Saxon 135-mile-a-day run for 30 consecutive days; the coast to coast trip over the Lincoln Highway, a distance of 3389 miles made in 30 days; the average of 34.53 miles per gallon of gasoline scored by more than

100 Saxons in different cities, each car running 200 miles in non-stop service.

New Improvements

Electric lights and starter (\$70 extra); wood wheels optional, 60-inch tread if desired, auxiliary seat (\$10) to accommodate a child as a third passenger, and other new features now provide every comfort and convenience you may wish.

Dealers: It will pay you to investigate the Saxon if you are interested in making more and more money every season.

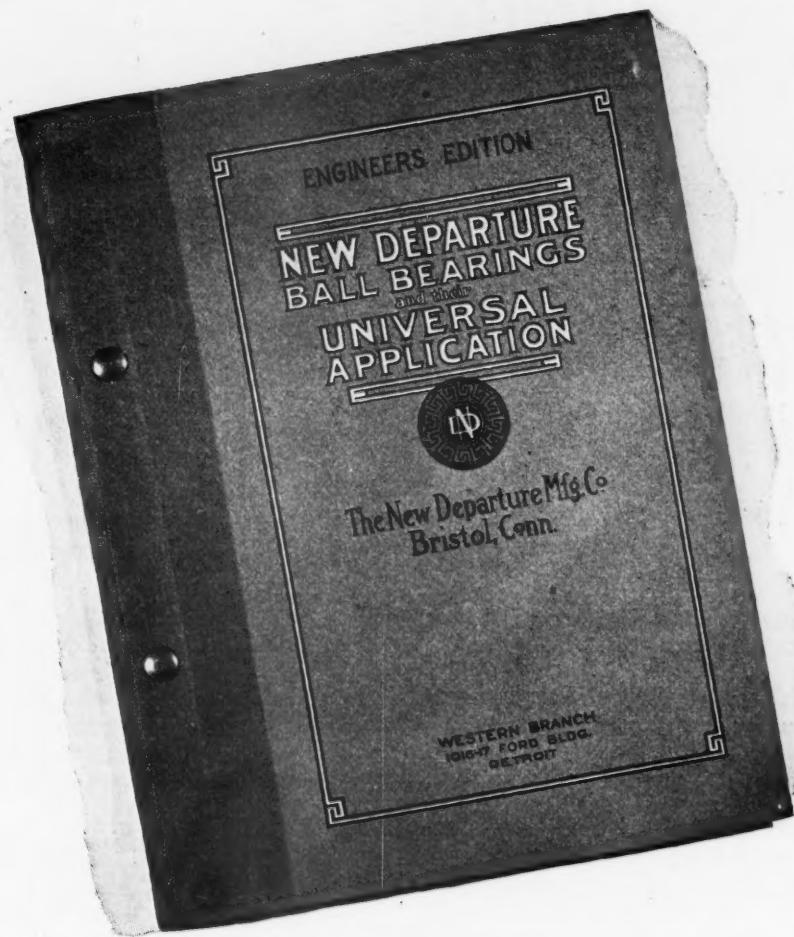


Saxon Delivery Car, 400 pounds capacity, besides driver's weight, \$395

Saxon Motor Company, Detroit

Write today—or better still, wire—and find out if your territory is open

The Engineering Edition of the New Departure Ball Bearing Catalog is Ready



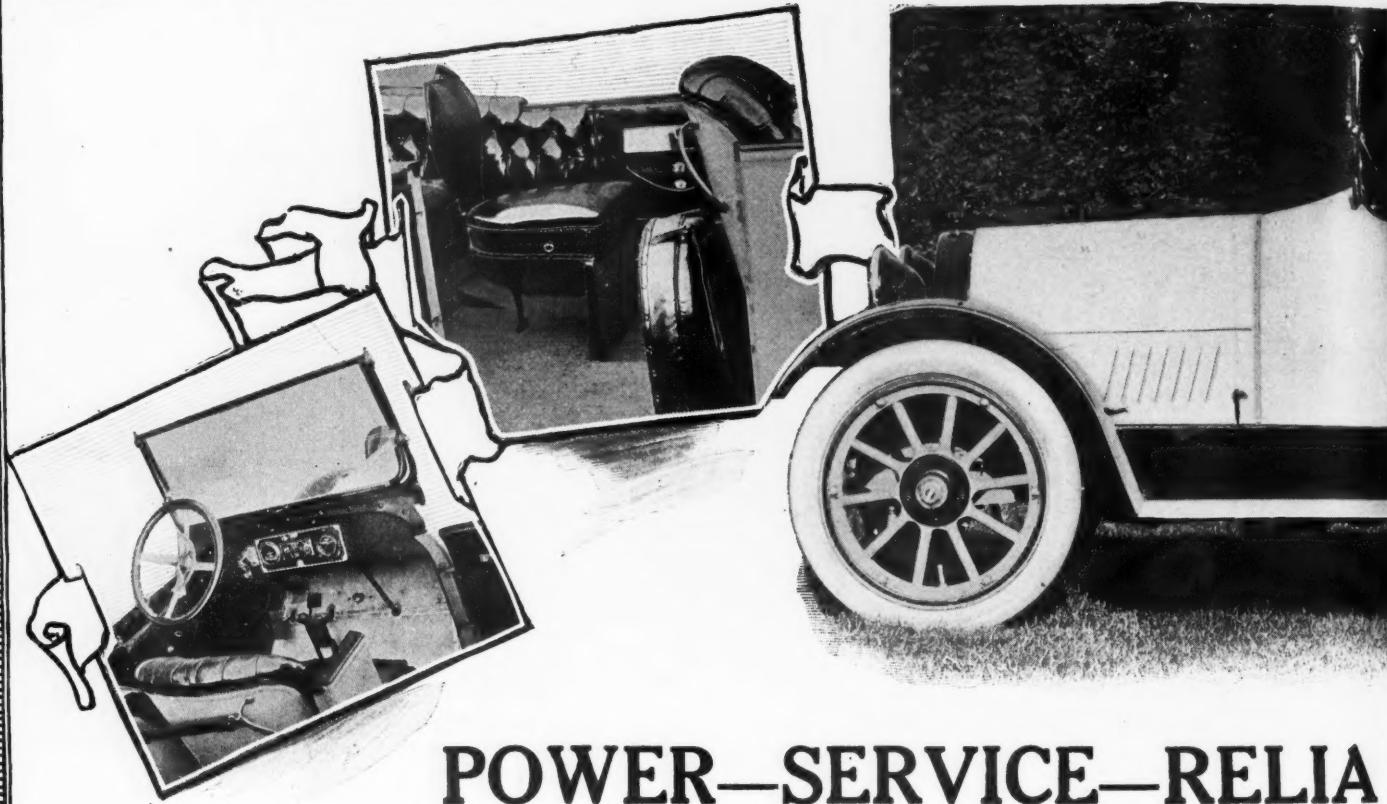
IN this New Catalog, published in loose leaf form with binder, will be found modern applications of New Departure Ball Bearings to parts of Motor Cars.

No technical library is complete without this book
Send for a copy.

**THE NEW DEPARTURE MFG. CO.
BRISTOL, CONN., U. S. A.**

Western Branch—1016-17 Ford Bldg., Detroit, Mich.

A GREAT CAR BASED



POWER—SERVICE—RELIABILITY

The Lexington Thoroughbred Six has them all to an exceptional degree.

Here is the great car for the motorist who is not satisfied with the "ordinary" six.

Here is the great car for those sterling, substantial people who own better homes, support better schools, live better lives and whose discrimination and good taste is always reflected in the purchase of "quality" under all conditions.

We are building this particular type of a thoroughbred car for the particular type of people just described.

We offer them an automobile that has all the outward marks of refinement, good style and superior quality that distinguishes a superior product of any description from the ordinary type.

But refined exterior and good style are not enough in an automobile. It must have stamina, strength, power and give dependable service all the time—every day—every hour, winter, summer, spring, fall.

The Lexington Thoroughbred Six has warrant for saying that no automobile mechanism at any price can give better satisfaction because none has been built with a more careful attention to detail in manufacture or quality of material, and the wonderful performance of this car in service is its record of consistent reliability.

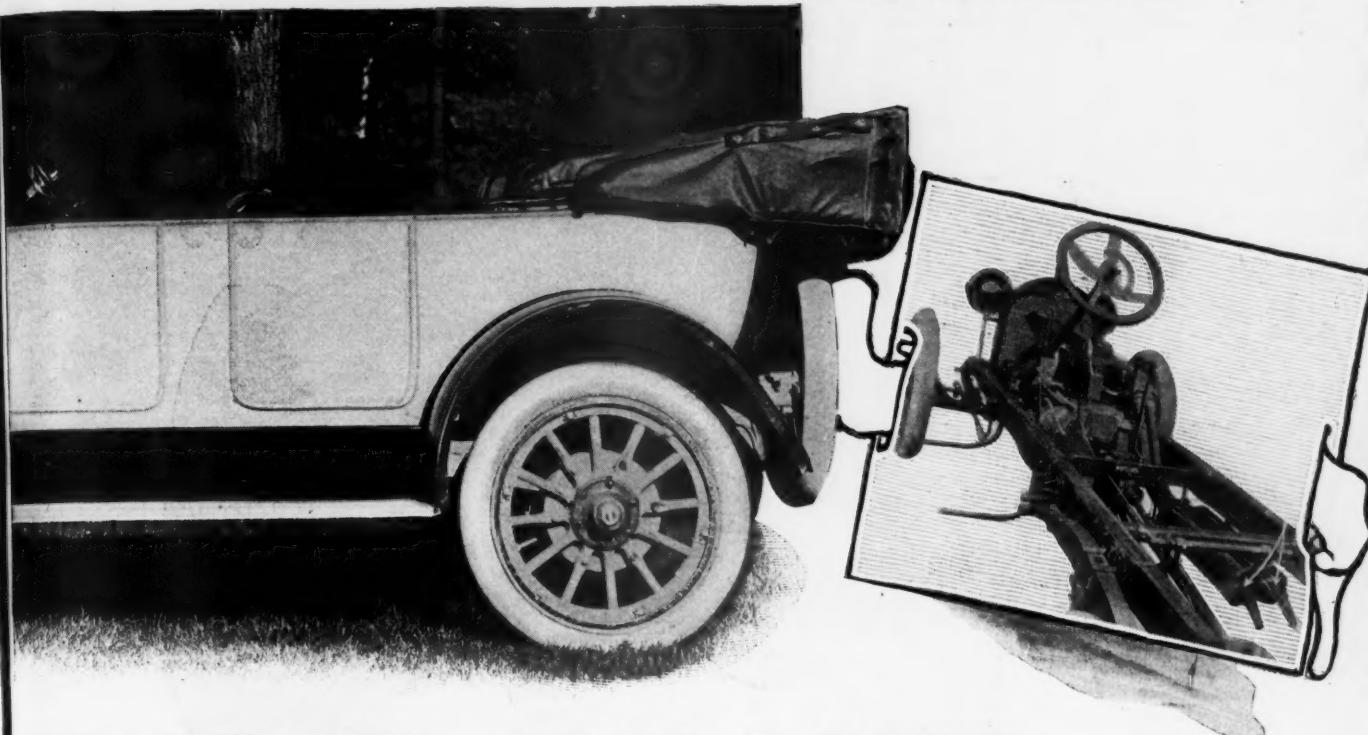
There must be a reason why we ask several hundred dollars more for this car than is asked for any one of a dozen other six cylinder automobiles.

Yes, there is a reason; there are a dozen reasons, and they are the real substantial reasons that appeal to real substantial motorists.

They all end up in the net result. The Lexington Thoroughbred Six is a **better car**.

There are mighty few secrets left in automobile manufacturing. The costs of metals, materials and construction are pretty well standardized and so are the qualities. And second quality parts are as easily procured as firsts—with prices accordingly.

ON A BIG IDEAL



ABILITY AND GOOD LOOKS

It takes more courage to build a high grade car and keep it high grade all the way through than to build cheaply and cut costs.

The man who builds well, carefully, and maintains a strict adherence to quality standards, must get a better price than the man who makes a price first and then cuts corners to get by with it.

The Lexington Thoroughbred Six is \$1875, F. O. B. factory. A few years ago \$4500 would have been a fair price for an automobile as good as this one. Even today many cars at double this quotation cannot exhibit elegance of construction or quality of features in mechanism that we do not duplicate.

We prefer that you compare the Lexington Thoroughbred with the highest priced cars, and in this comparison is where its true value is quickly apparent.

It is folly to let low price be a determining factor in deciding the purchase of a high powered automobile in which the owner may risk the life of family and friends.

The discriminating motorist who knows the wickedness of weak construction is no longer tempted to save in the purchase and waste in the repair shop with a world of trouble always impending.

We are automobile builders by right. We have built the most important elements that go into motor cars for years; have supplied millions of dollars' worth to other makers; we have some things that the public does not know about the claims for quality that are so lavishly made.

The Lexington Thoroughbred Six is seeking your acquaintance if you are the motorist who wants what this car can give you.

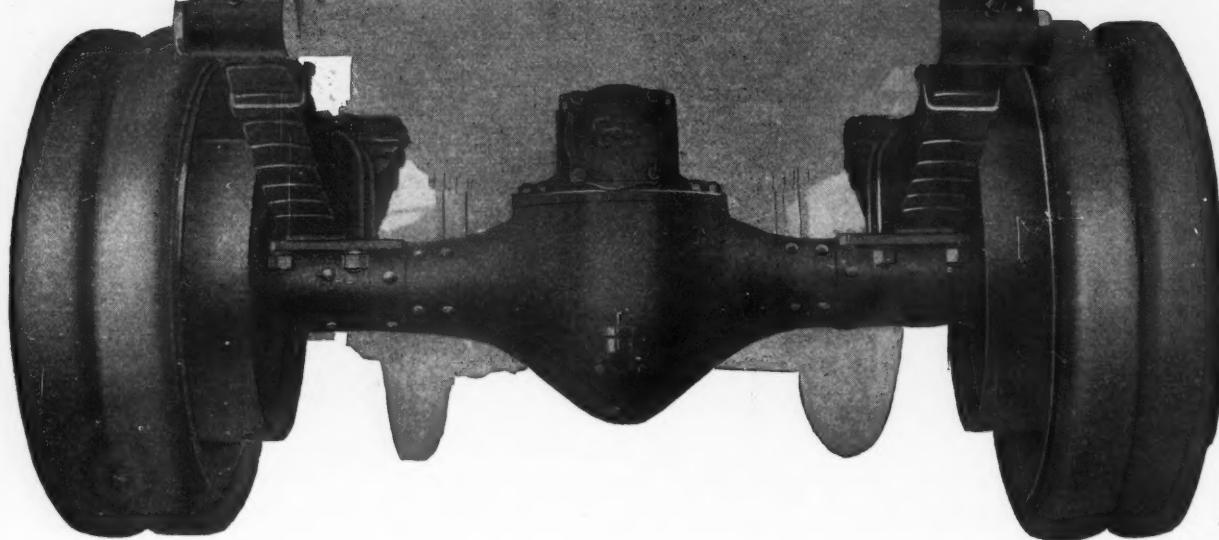
POWER—SERVICE—RELIABILITY AND GOOD LOOKS

Mechanical Details and Specifications gladly furnished on request. They will interest you. Where we have no representation, the dealership of the Lexington Thoroughbred Six is an opportunity for an aggressive dealer, and we are ready to correspond at once with men who can sell an exceptional car at a fair price.

The Lexington-Howard Co.
18th Street West, Connersville, INDIANA

SHELDON

WORM GEAR AXLES



Announcing the New Sheldon 1500 lb. Worm Gear Driven Axle

On the opposite page is shown a reproduction of the new Sheldon Worm Gear driven rear axle, suitable for a truck of 1500 pounds capacity.

This axle differs from the other models practically in size and capacity only. It follows the same general features of construction and shows the same remarkable efficiency in operation.

Like the larger models, it is designed solely with the view of giving maximum service at minimum cost—rather than to be sold at a price or for the purpose of selling bearings.

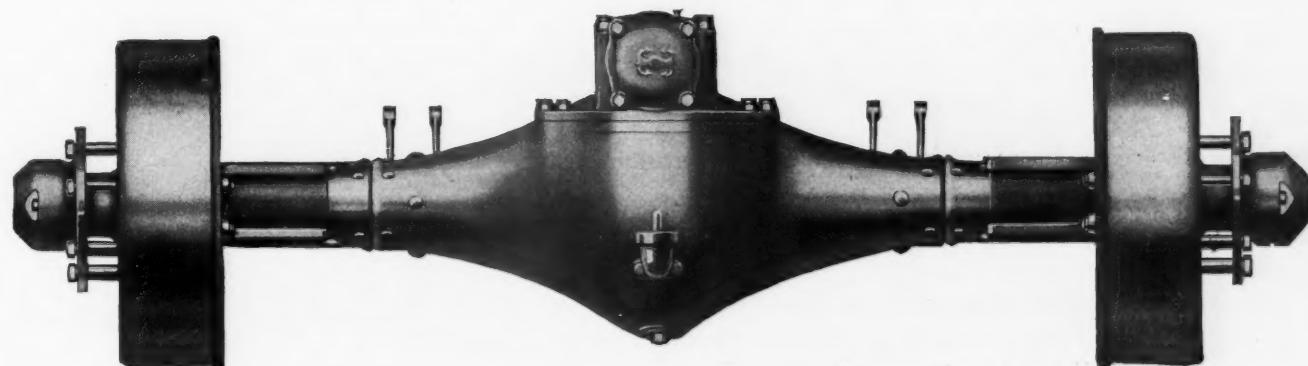
It is of the semi-floating type with the loads, both radial and thrust, on the worm and gear taken by ball bearings.

The bringing out of this smaller size worm gear axle now enables users of light delivery cars and trucks to avail themselves of the exceptional service offered by the Sheldon company.

Here is an axle that by tests of every conceivable nature has shown from 94 to 97% of power effort delivered to the rear wheels. An axle so sturdy in design and so rugged in construction as to withstand successfully the most severe sort of use and abuse. An axle in which there are no adjustments because adjustments are never necessary.

Note the clean-cut appearance of the finished product—and note also that there is ample clearance provided for the use of skid chains.

Remember that in addition to worm gear axles the Sheldon Axle and Spring Company also specializes in the manufacture of front axles, springs and brake and radius rod equipments.



THE SHELDON AXLE AND SPRING COMPANY

MAKERS OF SPRINGS AND AXLES FOR HEAVY DUTY SERVICE FOR MORE THAN 50 YEARS

WILKES-BARRE : : : : : : PENNSYLVANIA

Chicago: 122 S. Michigan Blvd.

San Francisco: 444 Market St.

Detroit: 1215 Woodward Ave.

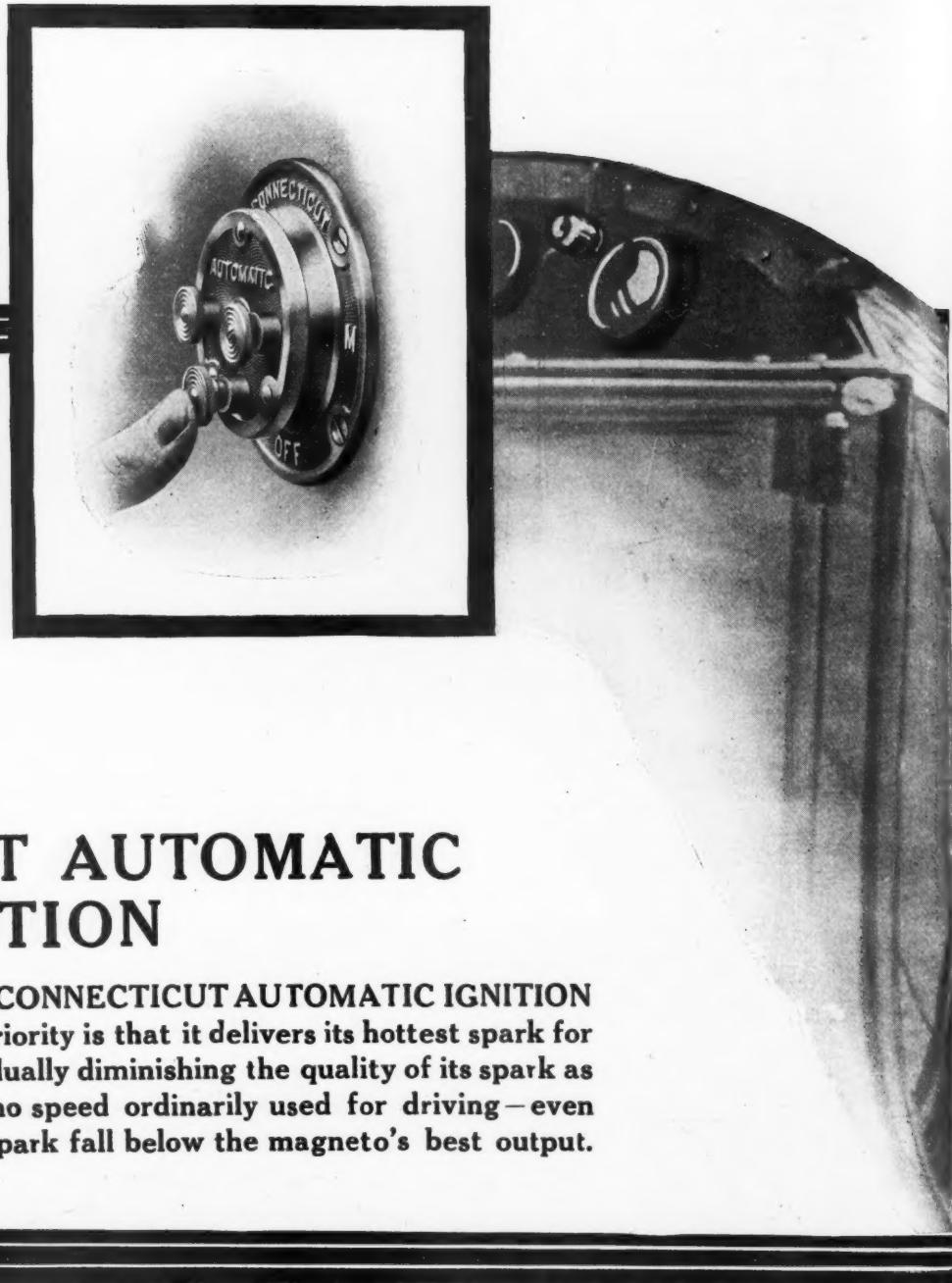
CONNECTICUT

The kind of ignition your car should have is the kind which works hardest to help your motor and its starting system when the carburetor and other conditions are unfavorable.

Such a system is

CONNECTICUT AUTOMATIC IGNITION

All you need to know about CONNECTICUT AUTOMATIC IGNITION to understand its practical superiority is that it delivers its hottest spark for starting and at low speeds—gradually diminishing the quality of its spark as motor speed increases—yet at no speed ordinarily used for driving—even racing—does the quality of its spark fall below the magneto's best output.



Let us review the various conditions which arise in every day motoring and see how CONNECTICUT AUTOMATIC IGNITION tempers its efficiency to give the best and most economical results.

In starting a cold motor, when carburetion is poor and combustion slow, the value of the intense spark delivered by CONNECTICUT AUTOMATIC IGNITION at slow speed cannot be overestimated. Working with an

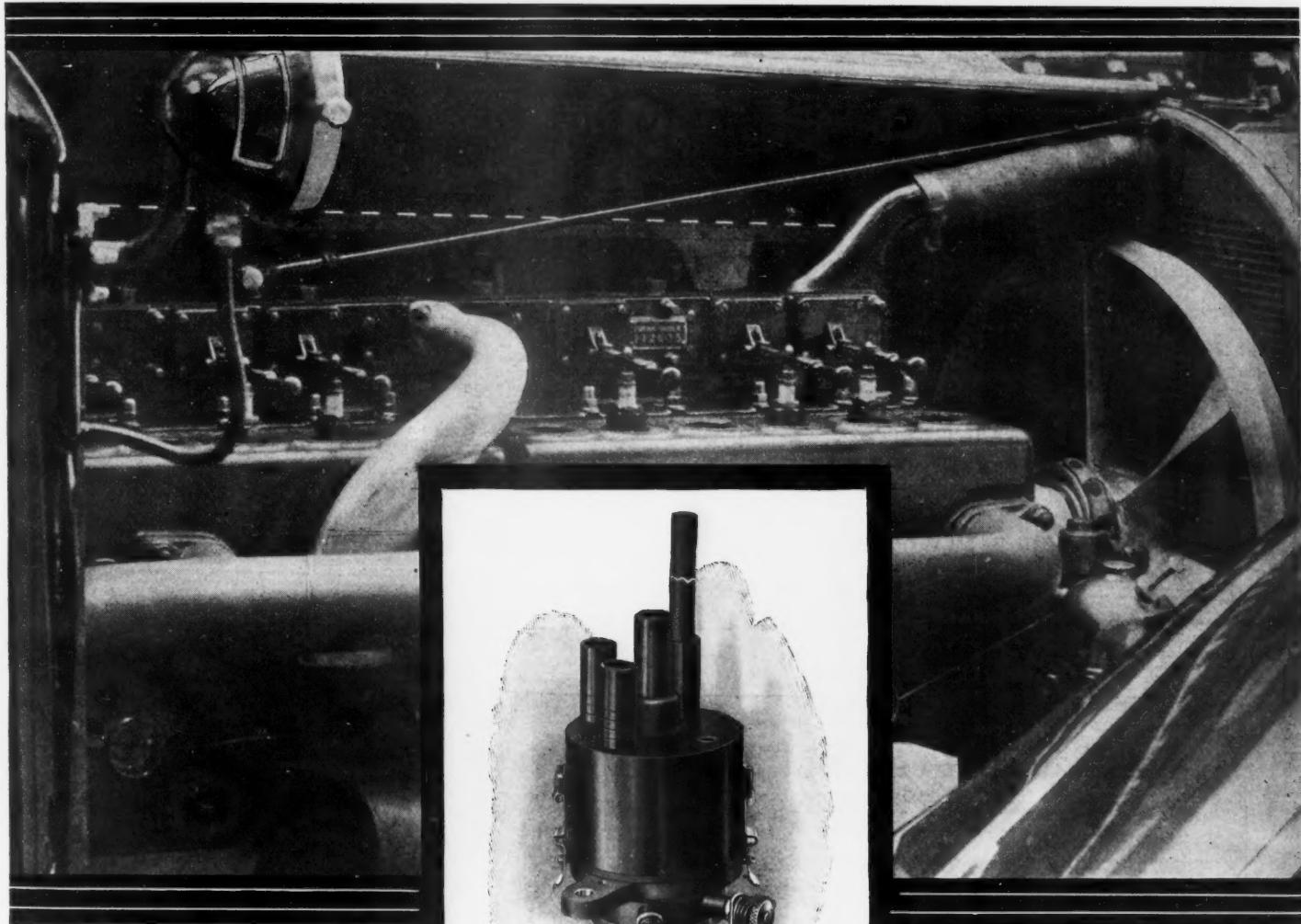
electric starting system it shows a wonderful saving in battery current.

The same benefits accrue from its intense spark for slow driving, as in traffic or otherwise.

For hill-climbing with a heavy charge of gas a hot spark is most necessary. Then as much as any time the value of a spark which gathers intensity as the motor slows up is most beneficial. Further, you can avail yourself of the advantages of unlimited advance

CONNECTICUT **TELEPHONE**
& ELECTRIC **COMPANY**

The Kind of Ignition Your Car Should Have



and retard without affecting the quality of the spark. In this respect the magneto's range of advance is not only limited but the quality of its spark suffers with every degree of retard.

For level driving the quality of its spark is adequate at all motor speeds.

We have contended always that a hot spark properly synchronized is the secret of

good ignition and that it is impossible to get a spark of the proper intensity to induce synchronization without thorough saturation of the primary coil.

You can prove the truth of our contention by driving your car at varying speeds for the practical superiority of CONNECTICUT AUTOMATIC IGNITION will make itself felt to the most inexperienced driver.

NY, Inc.

MERIDEN, CONN.

MAKE \$250⁰⁰ A MONTH REPAIRING AUTOMOBILE TIRES

Sounds like a lot of money—IT IS—A WHOLE LOT of MONEY to be earning CLEAR every month—yet it's what hundreds of men we have established in the Automobile Tire Repair Business are making. You let down the DRAW BRIDGE for SUCCESS to enter into your career by getting into business for yourself. The business for you is the one where investment is small—the returns quick and for cash—where the margin of profit is large—the demand for your PRODUCT or SERVICE constant and ever on the increase.

A Haywood Tire Repair Equipment

tainty of success in this business is as sure as anything in this world can be—Each year adds thousands of new Automobile Owners—they need YOU to keep their tires in service.

Here Is Your Opportunity!

Be first to enter this new, big paying business in your town. Open your pockets. Let the dollars pour in. Act quick. Every auto sold means more tires to mend. Automobile business is growing fast—enormous field for tire repairing. Punctures and blowouts are common. Tires need retreading and vulcanizing. Something going wrong all the time. Thousands forced to buy new tires because they can't get old ones fixed. Think of the old bicycle days—repair shops on every corner—all making money—busy day and night. Autos make same proposition over again—only ten times bigger and better. Users of Haywood Tire Repair Plants are making big money. Johnston, Tex., writes: "I have made as high as \$18 in a day." Another man who bought a plant September, 1911, writes he has cleared over \$3000.00. That's going some! Operate a plant as a side line in connection with auto business—garage or as an independent business. Find neighborhood where there's a bunch of autos—get all the steady business besides transient work. Experience unnecessary. You learn quick. Simply follow directions—practice a few days on a couple of old tires and you'll be ready to coin money. Business comes fast and easy.

HAYWOOD TIRE & EQUIPMENT COMPANY

answers to all of these requirements of Old Dame Fortune—the cert-

This Man is Making Money

Repair Tires At Home

Young men! and boys repair father's tires—get money he pays garage man. Get the neighbor's work. Make money to attend college or to start a garage and repair business. Auto owners—repair your own tires—save money—pay for your outfit in short time. We have outfits for home use. Anyhow, investigate. Send today for catalogue. See the wonderful possibilities in this marvelous field. Learn of the enormous money-making opportunities in this fascinating new business.

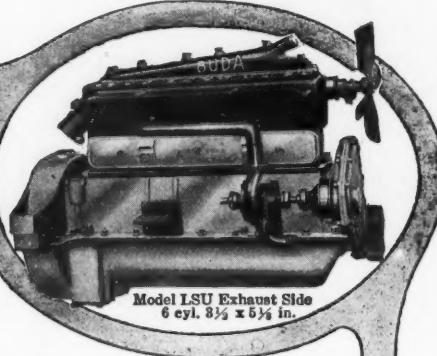
720 N. Capitol Avenue INDIANAPOLIS, INDIANA *The New Money-Making Business—Start Now*



Handsome is as Handsome does

We are so proud of the looks of the recent models L S U (Light Six), and R U (Light Four), that we can't help calling your attention to it. Note the racy clean cut lines. Surely you never saw a neater or better arranged design. This external balance and finish only hints at the more vital perfection within. (Furnished with or without bell housing).

BUDA
MOTOR
"The part that sells the car"



Model LSU Exhaust Side
6 cyl. 3 1/2 x 5 1/2 in.

But, after all,
*"handsome is as
handsome does."*
Now, as always,
performance, dur-
ability, quality,
workmanship,

form the keystone of the arch of BUDA GOOD-
NESS. Leadership can be based on nothing less.

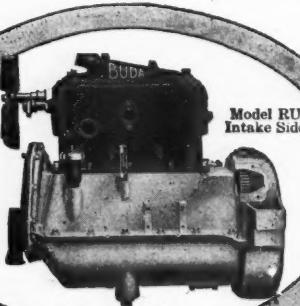
THE BUDA COMPANY

(Factory, Harvey, Ill., Chicago Suburb)

Address all correspondence to our factory representatives:

BRANDENBURG & COMPANY

1108 S. Michigan Ave., Chicago 57th & Broadway, New York 1811 Dime Bank Bldg., Detroit



Model RU Intake Side

4 cyl. 3 1/2 x 5 1/2 in.

GABRIEL SNUBBERS

Make Your Car Ride Easy and Last Longer

About Quiet Riding—

it is a notable fact that a large percentage of motorists used Snubbers for the first time to stop the rattle caused by other so-called easy riding attachments.

About Riding Comfort—

Snubbers are the one device that prevents excessive sidesway and up-and-down movement of long, flexible springs, without interfering with their free movement on ordinary roads, so essential to full riding ease.

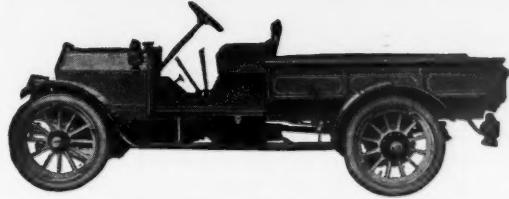
About Trade Preference—

Snubbers are standard factory equipment on the easiest-riding cars, including Chalmers, White, Peerless, Stearns-Knight, Lozier, and partial or special equipment on more than twenty other leaders.

Investigate! Send for Booklet!

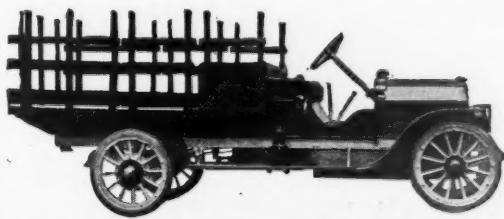
Gabriel Horn Mfg. Co., E. 1415 40th St. Cleveland, O.

**Ask the engineers
of your car about
Snubbers—they
have tested them
and know.**



Model A-3, 1,500-lb. Truck, Complete with Express or Stake Body,

\$1200 Chassis only \$1125



Model B-3, 1-Ton Truck, Complete with Express or Stake Body,

\$1500 Chassis only \$1400

Menominee 1500lb-2000lb-3000lb Trucks.

Act before it is too late. A heavy percentage of our 1915 output is already contracted for. A limited number of energetic dealers who can square with our requirements can be accommodated now. If you are the kind of dealer who can handle the fastest selling line of trucks at the price—WE WANT YOU.

"The MENOMINEE" TRUCKS

Investigate the construction of the MENOMINEE—the reputation it has among users—the organization and rating back of it. Write any of our 150 dealers—dealers who have re-contracted with us consistently throughout the last five years. Ask them about MENOMINEE service and co-operation. Your conclusion will be that it will prove to YOUR PROFIT for us to get together. Fill in coupon for full information and agency plan.

**D. F. POYER COMPANY
MENOMINEE, MICHIGAN**

D. F. POYER CO.,
Menominee, Mich.
Gentlemen—Send "Menominee
Trucks" me complete plan.
Name.....
Address.....

National

Parlor Car with
Adjustable Arm Chairs



THE *National* Parlor Car is appropriately named. In luxury and refinement this new *National* design excels the conventional touring car type to the same degree that the railway Pullman car excels the day coach.

These deep, massive, comfortable seats are veritable arm chairs. They are easily moved forward or back, and readily turned so that passengers can face each other. When adjusted the chairs are held firmly in place.

The *National* Parlor Car is entirely new, being conceived, designed, and built, to supply an existing demand for a better style of arrangement.

With the movable seats the tall or short driver can place the entire seat in the exact position desired. This feature will be appreciated by lady drivers.

The long, graceful body is lower than the regular touring car. The arm chairs show above it. Mechanically the Parlor Car is the same as the famous *National* Sixes. In finish and appointments it is superb.

Series AA—Six, \$2375

In 2, 4 and 5 Passenger Car

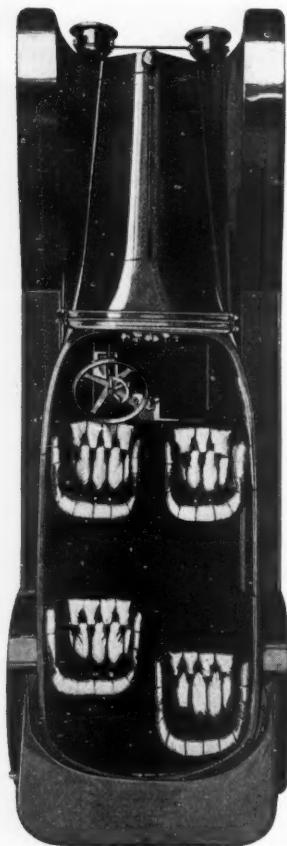
PARLOR CAR, \$2700

Now ready—Art Folio of new body design. Write for a copy.

National Motor Vehicle Co., Indianapolis, Ind.



WARNER MODEL S10
FOR 2,400 POUND CARS



WARNER STEERING GEARS

The dependability built into Warner Gears and the lasting service rendered due to accurate workmanship and careful selection of the best materials have kept Warner Gears

"STANDARD FOR YEARS"

Warner products are always a sign of highest quality in the motor car.

HIGHEST QUALITY

**TRANSMISSIONS
STEERING GEARS
DIFFERENTIALS**

**WARNER GEAR CO.
MUNCIE, IND.**

Detroit Office, 910 Ford Bldg.



A speedometer of absolute accuracy and dependability for Fords, Buicks, Maxwells and other low and medium-priced cars.

GARFORD 3-Inch Type SPEEDOMETER

Built with the same painstaking care as speedometers selling at many times its price.

A speedometer which jar, vibration and road shock will not affect. Absolutely simple.

No jewels, hair springs or sensitive mechanism to impair accuracy or make for trouble. But one spring used in the entire construction—that for bringing the indicating parts back to zero.

Has a 100,000-mile season and 100-mile trip odometer. The easiest-read speedometer on the market. Fully guaranteed.

Price, \$12.50 Complete With All Connections

To be had at your dealer's, or sent direct on receipt of price.

Dealers and Jobbers Wanted Everywhere

The Garford Mfg. Co.
2503 Olive St. Elyria, Ohio, U. S. A.
BRANCH
The Garford Mfg. Co. Kansas City, Mo.
DISTRIBUTORS
The Dean Electric Co., Seattle, Wash.
The Dean Electric Co., Los Angeles, Cal.
Sumter Telephone Supply Co., Sumter, S. C.

Be Sure About the Service Before You Buy Any Storage Battery



You can't tell by appearance, for the finest terminals, connectors, jars, etc., cannot compensate for deficiencies in the plates, which really are the battery.

Plate faults show up only after a battery has seen service, so the battery maker's known ability and business integrity must be your protection.

Gould Storage Battery

The Gould Battery has proven best as a logical result of our long-life, high-capacity, hard-paste plate construction. In every field we have entered, this battery has made enviable records and for 14 years the name Gould has stood consistently for fair, honorable treatment of customers.

If you place your order without inviting our beneficial competition, you deny yourself the great advantages of economical buying, the backing of the strongest organization in the storage battery field, and the use of widely distributed service facilities.

Ask about our starting and lighting types for gas cars and about our capacities and durability on propulsion types for electric vehicles.

Gould renewal plates fit jars of any make.

Gould Storage Battery Co.

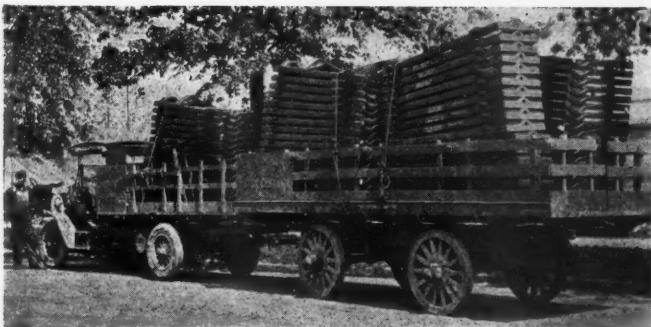
General Offices: 30 E. 42d St.
New York City

Works:
Depew, New York

Boston—14-16 Cambria St. Chicago—225 E. 22d St.
Philadelphia—613 Betz Bldg. San Francisco—1448 Van Ness
Cleveland—1761-5 E. 18th St. Avenue
Detroit—Kerr Bldg. Los Angeles—110 E. Pico St.

Agents in
Washington, Rochester, Buffalo, Pittsburgh, Milwaukee, Minneapolis, St. Paul, Kansas City, Omaha, Denver, Topeka, Seattle

CANADIAN REPRESENTATIVE:
R. E. T. Pringle, Toronto, Montreal, Winnipeg, Vancouver
Full stock of parts, plates and repairs carried by all offices and agents.



What a Troy Trailer Does for the Saxon Motor Company

The Saxon Motor Company of Detroit used to haul 15 complete sets of axles and transmissions on a 1½-ton truck; with a Troy Trailer they now haul 43 sets at no additional cost. The load of frames has been raised from 22 with the truck alone, to 55 with the Trailer. The average daily tonnage has been raised from 3,150 lbs. to 17,421 lbs.

Pay load has been increased 200 to 400 per cent without appreciably affecting operating expense. Send for Troy Trailer Booklet 4-MA.

The Troy Wagon Works Company

Troy, Miami County, Ohio

New York Detroit Washington, D. C.
50 Church St. 319 Hammond Bldg. 505 Riggs Building

Troy Trailers

**GUARANTEED
ONE YEAR**



The reasons for HERZ PLUG'S superiority to ordinary makes are definite and obvious.

The Insulation is DOUBLE STONE. The electrodes are PLATINUM-ALLOY. There are FOUR SPARKING POINTS. HERZ PLUG is SELF-CLEANING. It is GUARANTEED A FULL YEAR.

Price, \$1.50. Order from your dealer or
HERZ & CO., 245 W. 55th St. (nr. B'wy), New York



Twitchell Air Gauge The New Positive Lock Stop

feature renders absolutely impossible the registration of any but the exact pressure in your tires.

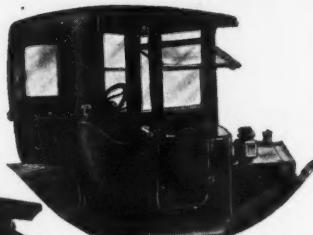
Don't Guess

Tires inflated to forty pounds look and feel exactly like tires containing eighty. The only way to tell the exact air pressure in your tires is by means of a TWITCHELL gauge.

Price One Dollar
For Sale by Jobbers, Dealers and Garages, or

THE TWITCHELL GAUGE CO.
1201 MICHIGAN AVE., CHICAGO

Closed Car Comforts for Ford Owners



ROADSTER
\$100 F. O. B.
Chicago



TOURING
\$150 F. O. B.
Chicago

The Mandel Limosette

converts the Ford into a handsome limousine, giving year round service. Attached in one hour—detached in less time. Fits flush to the Ford body. Gives solid comfort and real protection from wind and storm. Adds but 75 pounds to weight of touring car—40 pounds to roadster.

The MANDEL LIMOSSETTE is not the kind made of canvas and celluloid. It is durably constructed of kiln dried lumber reinforced with steel. Glass windows. Has rain-vision windshield, electric dome light, cowl dash. Built for 1913-14-15 Ford cars.

DEALERS

Live proposition. Get full particulars at once. 300,000 Fords to be "limosetted," gives dealers and agents a tremendous field.

SEND FOR CATALOG H—AT ONCE

MANDEL LIMOUSINE COMPANY
1455-1457 W. CONGRESS STREET, CHICAGO, ILL.

HIGH AND
LOW TENSION
MAGNETOS



MASTER VIBRATORS
ROAD SMOOTHERS
AUTO LOCKS

Don't Use Imitation Springs and
Contact Points In Your



MASTER VIBRATOR

K-W Master Vibrator owners are warned against the use of imitation springs and contact points on their Master Vibrators, as these positively will not work. For your protection all K-W points are put up in sealed envelopes, sealed with a label bearing our registered trade-mark. Look for this K-W seal label and the K-W Trade-Mark that is stamped on the top of the "T" shaped bridge.

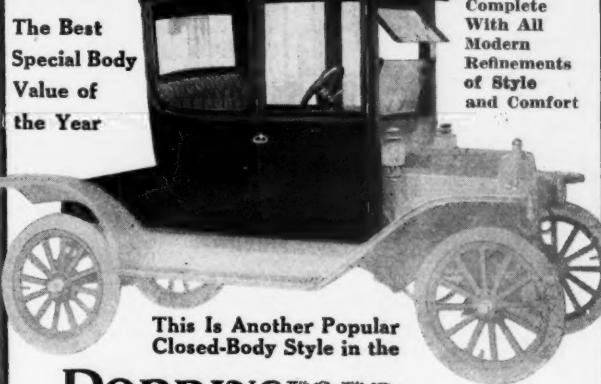
When replacing contacts use complete new springs. Do not solder new contacts to old springs, as solder destroys the contact and the spring itself will become bent and the cushion effect destroyed. The contact points on K-W Master Vibrators are large and are made of genuine platinum iridium, a material that costs three times as much as pure gold. Make sure you get the genuine with the K-W trade-mark. Price \$3 per pair.

In buying your Master Vibrator be sure you get a K-W. Look for the K-W trade-mark and the serial guarantee number. They protect you against imitations. If your dealer can't supply you we will send one direct, postpaid, on receipt of price. Write for "That Satisfied Feeling Folder."

HEADLIGHTING
OUTFITS

THE K-W IGNITION CO.
2835 CLEVELAND AV.
CLEVELAND, OHIO, U.S.A.

SPARK COILS
SPARK PLUGS



The Best
Special Body
Value of
the Year

Complete
With All
Modern
Refinements
of Style
and Comfort

This Is Another Popular
Closed-Body Style in the
**ROBBINSFORD
LINE**

The beauty and service of the justly popular ROBBINSFORD Coupe illustrated above does not appeal to the Ford owner merely because it transforms the Standard Ford Roadster into an elegantly designed, luxuriously appointed closed car—but because it increases the value and comfort of such a Roadster many times over the actual cost of the improvement. Equipment and appointments, equal to those usually found in cars of this type costing three times more, include double adjusting windshield; sashless windows of fine plate glass with patented, interlocking lifting device; electric dome lights, complete with wiring; elegant upholstered seats for three passengers. The floor is carpeted, fittings the highest grade, and, best of all, the entire body can be quickly fitted to any Standard Ford Roadster at trifling expense.

An Exceptional Opportunity for Progressive Dealers
ROBBINSFORD Standardized Bodies for Ford Cars are sold by Agents, Dealers and Coach and Carriage Establishments in many of the largest cities now. To men and firms who desire to extend their business and maintain its profit-level throughout the entire year, we have an extremely attractive Agency proposition to present. Write TODAY. Prepare now for Fall and Winter Business with Ford Owners who want to increase the value and service of their car.

IRVIN ROBBINS & CO.

10th St. & Canal
Indianapolis, U. S. A.

The Motorist's Winter Friend

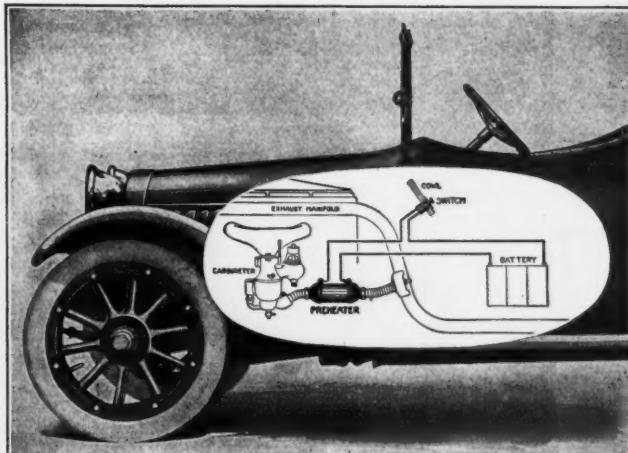
You Can Start Your Motor Easily When
It's Cold If Your Car Is Equipped With a



PAUL CARBURETOR — AIR — PREHEATER

PATENTS PENDING

"INSURES QUICK STARTING IN ZERO WEATHER"



METHOD OF INSTALLATION AND WIRING
DIAGRAM. ANYONE CAN INSTALL IT
—ANYONE CAN OPERATE IT

The Paul carburetor air PREHEATER is an electric heater, quickly attached to the fixed air intake of the carburetor. It heats the air before passing into the carburetor and is operated by the starting battery of the automobile or from any six volt source. It is turned on for starting only.

Every motorist knows that starting in cold weather is extremely difficult because gasoline does not vaporize readily at low temperatures. With a Paul PREHEATER vaporization is absolutely insured.

You Can Let Your Car Stand Indefinitely

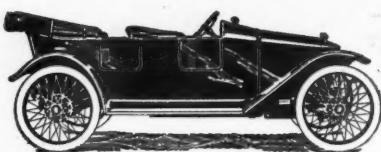
Prolongs battery life with electric starters
Eliminates excessive pressure with air starters.
Eliminates long and tiresome cranking with hand cranked motors.

Price, complete with Cowl Switch, 15 feet of wire and full instructions for installing and operating.....\$8.00

Delivered any part U. S. A.
Write for FREE descriptive booklet No. 4071
Agents wanted in every city

MANUFACTURED BY

Fort Wayne Engineering & Mfg. Co.
FORT WAYNE, IND.

Biggest Value Ever Offered**\$320—\$340****CAR-NATION CAR—20 H. P.**

Unit power plant, selective transmission, Dual magneto, shaft drive axle, V radiator, 30"x3" wire wheels, demountable rims, cantilever springs, 48" tread, 105" wheelbase, fully equipped with top, windshield, speedometer, horn, extra wheel.

SPECIAL PRICES

Touring Car..... \$340 Net
Roadster \$320 Net

ORDER NOW!

AUTO PARTS COMPANY, Dept. O
737-739 West Jackson Boulevard, Chicago, Ill.

MERCER**The Pride of America**

Actual performance speaks more than words. Consider the world's record-breaking victory of "Eddie" Pullen's Mercer in the road race at Corona, Cal., on Thanksgiving Day, and judge Mercer merit for yourself.

Distance, 301.8 miles.

Time, 3 hrs. 26 m. 32 s.

Average speed, 87.89 miles per hour.

Car traveled 128 feet every second.

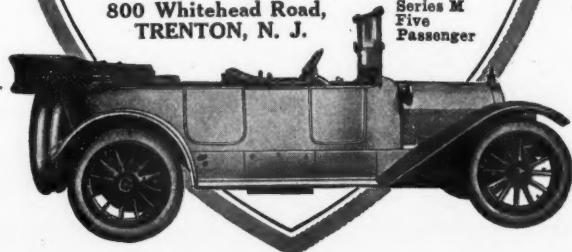
A new world's speed record.

Again we say—Choose your next car as a result of performances, and not promises.

MERCER AUTOMOBILE CO.

800 Whitehead Road,
TRENTON, N. J.

Series M
Five
Passenger

**Grinnell
Gloves***Best for Every Purpose*

with their exclusive features, "Rist-Fit," "Ventilated Back," and "Grip-Tite," have taught people to look for more than merely fine quality in gloves. So in addition to the selected Reindeer and velvet Cotskin of which these gloves are made, you have the further selling advantage which each of these features offer when you carry Grinnell Gloves in stock.

Good business for you on Grinnell Gloves, is not merely in the excellent profit on each pair—but in having definite advantages to offer the purchaser. Write us today for full details concerning Grinnell Gloves.



Style 4827
The
famous
Grip-Tite

Morrison-Ricker Mfg. Co.
64 Broad Street Established 1856 Grinnell, Iowa

**"Whitney" Chains
Are Used by the Leaders**

They have been the recognized leaders for years and are the most practical chains built for commercial vehicles.

We have completed a large addition to our factory, making it the most modern and complete factory of its kind in the country, and are now in position to fill orders promptly.

Insist on "Whitney" Chains when making replacements.

**"Whitney" Chains
Are Built for Strains**

The Whitney Mfg. Co.
Hartford, Conn.

There's no leak proof ring but the LEAK-PROOF Ring—insist

Over 200,000

Automobile and Marine Motors have been equipped with



in place of the piston rings originally supplied by the manufacturers.

LEAK-PROOF Piston Rings give perfect compression and maximum power—save gasoline and lubricating oil—reduce carbonization and motor wear.

Send for Free Booklet

It will tell you all about piston rings and what they mean to motor efficiency.

"Ask the User"



Sold by all up-to-date dealers, garages, repair shops and marine stores

Manufactured by

MCQUAY-NORRIS MFG. CO., DEPT. M., St. Louis, Mo.

Branch Offices:

New York—1919-29 Broadway, at 64th St. Pittsburgh—7620 Tioga
St. Kansas City—513 New Nelson Bldg. Chicago—Suite 718
Michigan Blvd. Bldg., Michigan Ave. and Washington St. San
Francisco—164 Hansford Bldg. Los Angeles—224 Central Bldg.
Canada—W. H. Banfield & Sons, No. 120 Adelaide Street, West,
Toronto. Dallas—1509 Commerce St. 5-A

Look for the name LEAK-PROOF stamped on the Ring

HERE IT IS!

The greatest Shock Absorber ever made yet sold at the right price and easily attached by the car owner. These cardinal points make the value:

The four corner bolts keep the spring aligned; whatever way the sway comes, the spring must give a straight pull.

Spring is enclosed dust-, grit- and water-proof in a glove-smooth housing packed with grease.

The sliding cam acts like a wrist of steel; gives to every sway yet holds firmly.

JUST LOOK AT THE PRICES!

For Ford \$11 per set of four
Cars up to 2600 lbs. \$16 per set of two

2700 lbs. and up. \$18 per set of two
Springs for 300 to 500 lbs., 75c each
Springs for 500 lbs. up, \$1.25 each

Profitable business in meeting the big demand, because dealers have only to carry in stock Springs of different weights to meet the requirements of different cars.

MANUFACTURED BY

B. & L. AUTO LAMP COMPANY
507-509 West 35th Street, NEW YORK, N. Y.

Designed to take care of the real problem of protection against shocks.



The Motorists' Purchasing Association LTD.

London, England

is open to take up the exclusive British Agency for a first-class make of pleasure car to sell here in competition against the "Ford" models, of which very large numbers are sold in England. We also deal largely in all kinds of motor accessories.

We have a considerable demand for light and heavy trade motor vehicles, including ambulance and heavy trucks for War transport purposes.

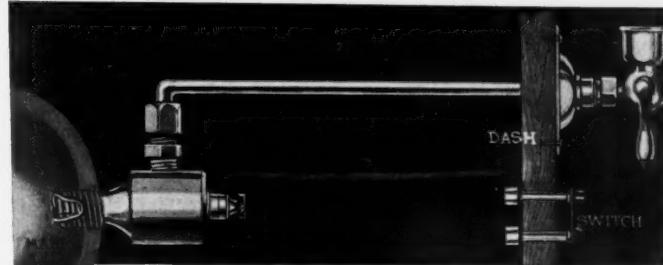
Only enterprising firms who are in a position and wishful to do an important and permanent business with England need trouble to correspond, as our Association, having the largest Membership and following of any purchasing organization of motorists in Great Britain, can command extensive sales for a really good reliable car at a popular price. We have the finest Showrooms in London—in the best position, and an experienced staff to display and sell the goods.

Highest references to London and New York Bankers and satisfactory guarantees for fulfilment of all obligations by both sides, will be given and required.

Correspondence is invited from suitable firms.

Address—Managing Director,

MOTORISTS' PURCHASING ASSOCIATION LTD.,
Egyptian House, Piccadilly,
London, England.



For An Easy Start With a Cold Motor

PRICE
\$5.00

Any morning nowadays it's a case of cold motor and crank, crank, crank, and prime, prime, prime before it gets away.

Eliminate your starting troubles NOW. Equip your car with an

Ieco MANIFOLD PLUG

This inexpensive little device will enable you to start your motor on the coldest day as easily as on a warm summer day. We say it will. Your money back if it don't.

The principle is simple. A few drops of gasoline into the priming cup on the dash. No lifting the hood, mind you. Then turn the motor over and bing! away she goes.

The priming charge has passed through the manifold plug which contains an electrically heated coil and has entered the cylinders perfectly vaporized, ready to explode at the first spark.

Another thing: it admits auxiliary air to the manifold at higher speeds resulting in 20% to 30% increased mileage per gallon of gasoline.

Can also be used to introduce kerosene into the cylinders in order to clear them of carbon.

Easy to attach if you follow our simple instructions. Dealers wanted everywhere.

Interstate Electric Company, New Orleans, La.

Patent Applied For

IT'S GETTING COLD
but your engine will start as quickly as in Summer
and the cylinders will fire as regularly if equipped with



1915 PRIMING PLUGS
Masters the motor at any temperature
All Sizes \$1.25 Porcelain or Mica

FORD DEALERS: Write for new price
EMIL GROSSMAN MFG. CO. Inc.
Bush Terminal Model Factory No. 20, Brooklyn, N. Y. C.
Detroit—708 Ford Building.

Your dealer can Install a Full Set of these Ford Shock Absorbers



The C-C Shock Absorbers are the most efficient of any on the market today and, notwithstanding, cost you the least, only \$8.00 for full set of four.

We guarantee that you will be satisfied with the C-C Shock Absorber or we will give you back your money.

So take your Ford to your dealer today and have him attach a set of C-C's while you wait—in half an hour.

COX BRASS MFG. CO.
ALBANY, N. Y.
Branches:
1777 B'way N. Y. C. 2637 Michigan Ave. Chicago, Ill.

\$8.00 for set of four **\$4.50** for set of two

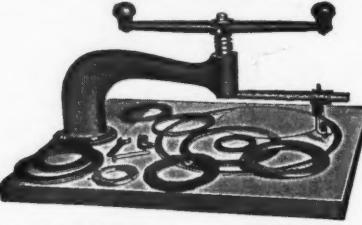
TRADE MARK
NON-FLUID OIL
REGISTERED
UNITED STATES
PATENT OFFICE



That NON-FLUID OIL best meets the exacting requirements for a WINTER (as well as Summer) automobile lubricant has been proved by thousands of leading motorists and automobile manufacturers during the last 19 years. Made only from the highest grade mineral oils, NON-FLUID OIL is not affected by temperature, but retains its "body" in any climate and lubricates perfectly to the last small particle. Lasts 3 to 4 times longer than LIQUID oils, and greases,—hence, is MOST ECONOMICAL.

"K. No. 00 Special" grade for sliding gear transmission
"K. No. 000" for differential, compression cups and all bearings
Sold by leading dealers everywhere. Look for the orange-colored can bearing sprocket-wheel trade-mark shown above

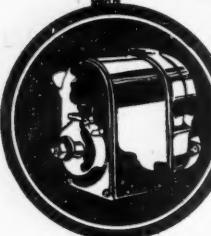
New York and New Jersey Lubricant Co.
165 Broadway, New York 1430 Michigan Ave., Chicago



THE SPRINGFIELD CIRCLE CUTTER
For Cutting
Lamp Glass, Sheet Copper and Rubber
Gaskets, Felt and Fiber Washers, Etc.
Capacity any size circle
from 0 to 14"

Positive Measuring Scale
to determine sizes
MANUFACTURED BY
THE SHAWVER CO., 220 Winter Street, Springfield, Ohio

EISEMANN



The most simple—the most accessible—the most durable—the most efficient magneto ever produced is the new Type G-4.

The Eisemann Magneto Company
Sales and General Offices,
32-33d St., Brooklyn, N. Y.
New York N. Y. Indianapolis, Ind. Detroit, Mich.
123 W. 52nd St. 514 N. Capitol Ave. 802 Woodward Ave.

PENNSYLVANIA
Oilproof
VACUUM TIRES



Making their mark everywhere
Guaranteed for 4500 miles
Pennsylvania Rubber Company
Jeannette, Pa.

Sparton Warning Signals

for the low—the medium and the high priced cars, motor driven & hand operated.

PRICE from \$4.25 to \$15.00

Write for DEALERS' Proposition

The Sparks-Withington Co., Jackson, Mich.

Schrader

Universal Valves
Trade Mark
Reg. U. S. Pat. Off.
Apr. 30, 1895

For sale by Tire Mfrs., Jobbers and Dealers or
A. Schrader's Son, Inc.
783-791 Atlantic Ave., Brooklyn, New York

PAT'D MAR. 14, '98, JULY 6, '99, OTHER PAT. PENDING
SCHRADER UNIVERSAL
TRADE MARK REG. IN U. S. PAT. OFFICE
TIRE PRESSURE GAUGE

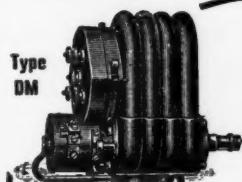
MADE BY A. SCHRADER'S SON, INC., NEW YORK



Magneto ignition overwhelmingly dominates the automobile world both in European as well as in American practice today, by reason of its simplicity and ultra efficiency. Cost is the one single drawback to its complete monopoly of the ignition field.

Insist upon SPLITDORF MAGNETO IGNITION—IT'S NECESSARY

SPLITDORF ELECTRICAL COMPANY
NEWARK, N. J.



HEINZE



The performance of HEINZE IGNITION APPARATUS for the past ten years justifies our claim that our product is superior in both points of construction and efficiency.

HEINZE ELECTRIC COMPANY

SALES OFFICES—DETROIT, MICHIGAN
FACTORY—LOWELL, MASS.

Service Stations—New York, Detroit, Chicago, Kansas City

THE
Practical.
Gas Engineer.

PRACTICAL GAS ENGINEER

By
E. W. LONGNECKER

Twelve years' constant experience with Hydro-Carbon Engines. How to start, how to operate, and how to care for all classes of explosive motors or engines using gas, gasoline or similar fuels. A full and exhaustive chapter on electric and other systems of igniting. Every line tells something. Every page full of interest. A book of 172 pages, neatly bound in cloth. Sent postpaid on receipt of price, \$1.00.

THE CLASS JOURNAL CO.
910 S. Michigan Ave., Chicago

(40)



"Keep
On Going,
Bill. I'm Coming
All Right"

WORRY about "getting home" doesn't bother the man whose car carries a Basline Autowline. Skidding, engine friskiness or tire troubles won't leave him stalled for long. He's ready to take a tow, or give one, any time.

Autowline is about 25 feet of $\frac{1}{4}$ -inch steel wire rope same name and quality as famous Yellow Strand Powersteel that helped dig Uncle Sam's big Panama ditch.

Basline Autowline

"The Little Steel Rope with the Big Pull"

weighs but $4\frac{1}{2}$ pounds. Coils under cushion or stows away anywhere. Pulls a 4000-lb. car up a 20% grade. If a tree or pole is handy to hitch to, Autowline will pull a car out of hole or rut on its own power.

All accessory dealers handle Basline Autowline. Price, east of Rocky Mountains, \$3.95. Get one and be ready for what's coming.



FREE Illustrated Autowline circular. Write for it

Broderick & Bascom Rope Co.

813 N. Second Street St. Louis, Mo.

New York Office, 16 E. Warren St.

Mfrs. of famous Yellow Strand Powersteel Wire Rope,

the rope with one yellow strand but no yellow streak

THE POWERFUL, SILENT SPHINX

\$695

A REAL AUTOMOBILE

The lightest, strongest, most serviceable and economical machine of its kind ever built.

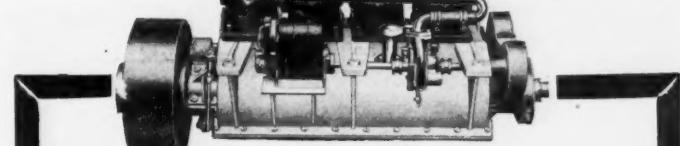
112 inch wheel base. Electrically started and lighted.

Sphinx Motor Car Company, York, Pa.

Famous for
silence, power
and durability

6-Cylinder
Model 6B... $4\frac{1}{2}$ x5

4-Cyl. Models
Model M....4x5
Model B.... $4\frac{1}{2}$ x5
Model 11....5x5
Model 12.... $5\frac{1}{2}$ x6
Model 12....6x6



Successfully used in commercial and pleasure cars for the past 15 years.

BRENNAN MOTORS

We build a special model adapted to Elmore and White Steam cars. Write us for detailed specifications.

BRENNAN MOTOR MFG. CO.,

Syracuse, New York



Maintains the correct lubricating body at any motor speed or heat

STANDARD OIL COMPANY (AN INDIANA CORPORATION)



Hyatt Quiet Bearings

HYATT SERVICE STATIONS

Atlanta, Ga.	Detroit, Mich.
Boston, Mass.	Los Angeles, Cal.
Chicago, Ill.	New York, (Harrison, N. J.)

SERVICE AGENTS

High Wycombe,	England
Broom & Wade	
Minneapolis,	Minn.
Pence Automobile Co.	

HYATT ROLLER BEARING CO.
DETROIT, CHICAGO
NEWARK, N.J.

Hyatt Quiet Bearings are used in the majority of American made Automobiles

Searchlight Gas

the most economical and dependable lighting system on the market.

Full details mailed to you on request.

THE SEARCHLIGHT CO.
GENERAL OFFICE, 1016 KARPEN BUILDING
CHICAGO, ILL.

THINK THOUSANDS OF MILES AHEAD, AND YOU WILL BUY
REPUBLIC MILEAGE
PLAIN AND STAGGERED TREAD
TIRES

THE REPUBLIC RUBBER CO.
YOUNGSTOWN, OHIO.
BRANCHES AND AGENCIES IN THE PRINCIPAL CITIES.

REPUBLIC
RUBBER
CO.

When Writing to Advertisers, Please Mention Motor Age.

Dayton Airless Tires

For War—Recommended by American and Foreign Experts for motor car service.

For Peace—Used all over the United States on cars of all sizes. Comfort and absolute freedom from tire annoyances.

For Fords—We are obliged to double our production on these sizes every three months. Enough said.

For All Cars—A tire that is absolutely blow-out proof and puncture-proof.

For You—Write today for full details and name of nearest dealer.

THE DAYTON RUBBER MFG. COMPANY
DAYTON, OHIO



PAIGE

Model "36" \$1195.00

A car whose design and construction is so far ahead of others at its price that it is in a class all its own. Gray and Davis Electric starting and lighting equipment, silent chain cam shaft drive, four inch by five inch motor, cork insert multiple disc clutch, 118 inch wheel base, left side drive, center control, and equipment complete to the last detail.

Model "25" \$925.00

Including Electric Starting and Lighting System

This model has made the Paige reputation. Such a sturdy, powerful, comfortable car has never been offered the public at anywhere near its price. \$925.00 with complete equipment.

Splendid Agency Proposition

Paige-Detroit Motor Car Co., Detroit, Mich.



COMPLETE THRUST BEARING

The Star Ball Retainer Co.
Lancaster, Pa., U. S. A.

Manufacturers of Radial Ball Retainers, Thrust Ball Retainers, Complete Thrust Bearings



BRAENDER
Tires & Tubes

Service and Satisfaction

The **only** set of tires to complete the entire 500-mile race at Indianapolis, May 30, 1913. Consider that 88 Tires of other makes were changed in this race.

Our "Victory Folder" explains other races. *Established Agents Solicited*

BRAENDER RUBBER & TIRE CO.
Rutherford, N. J.
Main Office & Factory, New York, 250 W. 54th St.

Bulldog Non-Skid



WYKLE AUTOMATIC GASOLINE VENDER

Patent applied for

Sells the Gasoline
Gets the Money
Takes Care of Itself

Adjustable to price charged per gallon

WRITE FOR AGENCY PROPOSITION

H. J. Wykle, 1362 So. Flower Street
LOS ANGELES, CAL.

NEW VULCAN "35"

"A Quality Car at a Quantity Price"

PRICES

TOURING CARS	ROADSTERS
5 PASSENGER	2 PASSENGER

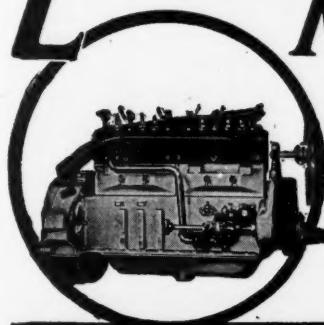
\$975

Completely and fully equipped, with Westinghouse Starting, Lighting and Ignition System

F. O. B.
PAINESVILLE
OHIO

Manufactured by VULCAN CAR CO., Painesville, O.

Continental Motors



FOURS	SIXES
Model U, 2 1/4 x 4	Model C, 4 1/2 x 5 1/4
Model N, 3 1/2 x 5	Model E, 4 1/2 x 5 1/4
Model N, 3 1/2 x 5	Model T, 5 x 5 1/4
Model C, 3 1/2 x 5 1/4	Model T, 5 1/4 x 5 1/4
Model 6-N, 3 1/2 x 5	
Model 6-P, 3 1/2 x 5 1/4	Model 6-C, 4 1/2 x 5 1/4

Continental Motor Mfg. Co.
Detroit, Michigan
Factory Representative, K. F. Peter-
son, 122 S. Michigan Ave., Chicago

WINTON SIX

Colors Tell

Today the color of every new car shows what it is. Cheap cars are uniformly sombre-hued and similar. They look alike. High-grade cars are the only ones finished distinctively. When you buy a Winton Six, our artists take your personal color scheme and produce for you a car as distinctly different from other cars as you desire. The 1915 Winton Six is the most admired car of the year.

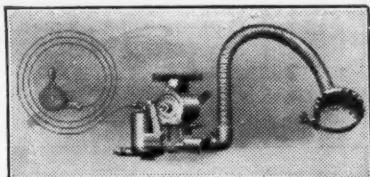
THE WINTON MOTOR CAR COMPANY

424 Berea Road, Cleveland, Ohio

World's First Maker of Sixes Exclusively

MASTER Carbureters

COPYRIGHTED
Every Dealer Can Sell the MASTER Now
Every Engine Can Have a MASTER Now



Not Ordinary Results
Phenomenal Results
More Lugging Power
More
Miles per Gallon
The men who sell the MASTER sell results.

MASTER CARBURETER CORPORATION
944 Woodward Ave. Detroit, Michigan
Pacific Coast States: Master Carburetor Co., Inc., Los Angeles

Guaranteed for 10,000 Miles Brictson Pneumatic Tires

We now sell Brictson Pneumatic Tires on a specific guarantee of 10,000 miles service. Brictson Pneumatic Tires are puncture-proof, blowout-proof, skid-proof, rut-proof, rim cut-proof, oil-proof and gasoline-proof. A tire with wonderful resiliency and easy riding qualities.

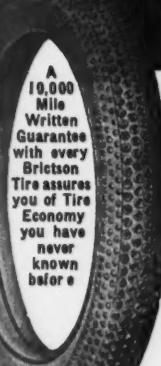
FREE TRIAL OFFER.—To remove any possible doubt concerning the merits of Brictson Tires and to back up our statements fully, we have a FREE TRIAL offer at our own risk. The only tire made that offers a FREE TRIAL—you can't go wrong. You risk nothing. We take all the risk. Be sure and ask for our FREE TRIAL plan when you write for particulars.

Have Your present Tires Rebuilt the BRICTSON WAY—If you are not in need of

new tires and the fabric in your tires is still good, we can rebuild them the Brictson Way, give you thousands of miles additional service and make them puncture-proof, blowout-proof, skid-proof, rut-proof, rim cut-proof, oil-proof and gasoline-proof.

Write today for full particulars including details of FREE TRIAL PLAN.

THE BRICTSON MFG. CO.
12-124 Brictson Bldg., Brookings, S. Dak.



When Writing to Advertisers, Please Mention Motor Age.

CORCORAN Lamps

GAS, OIL, AND ELECTRIC
CORCORAN LAMP CO.
CINCINNATI

KINGSTON CARBURETOR

Save Money by Economizing Gasoline

Four floating bronze ball valves opening automatically under different motor suction supply a uniform mixture at any speed, regardless of hot, cold, wet or dry weather.

Write for details and let us tell you why so many manufacturers are adopting this carburetor as standard equipment.

Made by the oldest manufacturers of carburetors in America

ESTABLISHED 1895

BYRNE, KINGSTON & COMPANY, Kokomo, Indiana

Valuable Tire Book FREE!

Send at once for our book "Care and Repair of Tires" and secure the most valuable information on the care, up-keep, and repair of Auto tires. In this book you will learn—

Correct Pressure
Correct Size
Care of Rims
Care of Spare Tires
Care in Winter

Emergency Repairs
Prevention of Overheating
Effects of Careless Driving
How to Cut Repair Bills
How to Get 10,000 Miles Use

and you will also find out how to keep down tire repair bills with

SHALER Vulcanizers

This wonderful tire accessory repairs cuts, punctures, slits, or blow-outs in casing or inner tube anywhere and leaves the vulcanized spot the strongest part of the tire. Send for this free book.

C. A. Shaler Co., 249 4th St., Waupun, Wis.

For the Cowl or Dashboard—

Weston MODEL 301 Ammeters



Specially built for continuous reliability in automobile service. Weston improvements and minute attention to the perfecting of detail have raised them far above any other small instruments in accuracy, durability, appearance. Despite its high standard of service, Weston Model 301 is surprisingly inexpensive.

Weston Electrical Instrument Co., Newark, N. J.

New York Boston San Francisco Atlanta Berlin and
Chicago St. Louis Detroit Richmond London
Philadelphia Denver Cleveland Toronto

Atlanta Berlin and London

METZ "Twenty-Two" Roadster

WINNER OF THE
GLIDDEN TOUR

\$495



Gearless Transmission

Fore-door body, extra thick tufted upholstery, plate glass rain-vision wind shield, left-hand drive with center control, 4-cylinder, 22½ H. P. water-cooled motor, Bosch magneto, Prest-O-Lite tank, extension top, full elliptic springs, artillery wheels, best quality Goodrich clincher tires, 5 lamps, horn, pump, jack, tools. Speed, 50 miles per hour. Bests 'em all at climbing hills. Secure EXCLUSIVE SALE in your territory. Write for terms and Catalog "K."

METZ COMPANY

WALTHAM, MASS., U. S. A.

Electric Auto-Lite Starting-Lighting-Ignition

Electric Auto-Lite equipment for automobiles is as famous for the service that backs it as for the reliability and economy of its operation.

ELECTRIC AUTO-LITE COMPANY

Home Office and Factory: Toledo, Ohio

New York Detroit Kansas City San Francisco

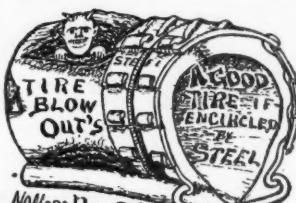


THE FORD LINE

Runabout \$440—Touring Car \$490—Town Car \$690—and the two new Ford cars: Coupelet \$750—Sedan \$975.

With full equipment f. o. b. Detroit

Ford Motor Company.
Detroit, Mich.



Steel Protectors

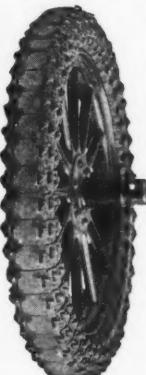
Each section 2" wide $\frac{1}{8}$ " thick. They hook to rim. As flexible as ever. Anti-skid, can't blow out or rim cut.

HOW CAN THE RUBBER WEAR OFF
IF IT IS COVERED WITH STEEL?

Try 2 or 3 sections over any old blowout

Special prices to the first in new territory

Kimball Tire Case Co. 173 Eddy St. Council Bluffs, Ia.



Tire covered complete

SALISBURY

AXLES WHEELS PROPELLERS

W. S. Co. Salisbury Wheel & Mfg. Co. *W. S. Co.*
JAMESTOWN, N.Y.

Thermoid
HYDRAULIC COMPRESSED
Brake Lining - 100%

THERMOID RUBBER CO., Trenton, N. J.

The Detroiter-\$985

FIRST
Pure
European
Streamline
in This
Country



With Westinghouse
Starting and
Lighting System

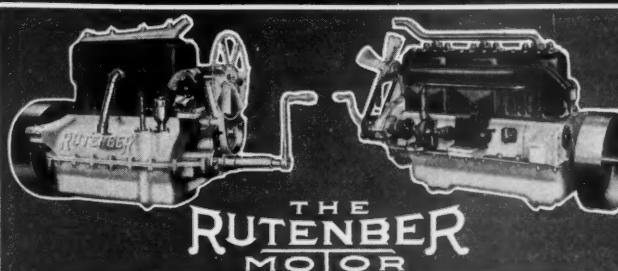
FIRST
Long-
Stroke
Ball-
Bearing
Motor

Full Floating Rear Axle, Platform Rear Spring Suspension, All Recording Instruments in One Unit, Red Electric Flash Oil Gauge, Carburetor Above Frame, 112 Inch Wheel Base, Left Hand Drive, Center One-Lever Control, Multiple Disc Clutch in Oil, Less than 2300 Pounds, 32 H. P.

Briggs-Detroiter Co., 455 Holbrook Ave., Detroit, Mich.
Write for Catalog and Proposition

Dyneto
REGISTERED TRADE MARK
Single Unit Weight 45 lbs.
Electric Starting and Lighting System

Famous for Power and Non-Stalling Efficiency
DYNETO ELECTRIC COMPANY Catalog on request
Send Us Your Electrical Problems Syracuse, N. Y.



THE RUTENBER MOTOR

Rutenber Motors, fours and sixes, should not be judged by ordinary standards. They are not ordinary motors. Whether applied to pleasure cars or to commercial cars, these motors are invariably found to give service and satisfaction not attainable by standard built motors, regardless of price.

THE RUTENBER MOTOR CO., MARION, INDIANA

BOSCH

Magneton are used as the ignition system on all the better types of automobiles.

Look into this.

Be Satisfied Specify Bosch

Bosch Magneto Co.
214 West 46th St., New York



When You See
"NON-SKID"
Think of
Firestone
The Imprint of Safety

Multipplied mileage—with the surest skid protection you can buy. Extraordinary value—ordinary price. Write for the reasons.

Firestone Tire & Rubber Co.
AKRON, OHIO
Branches and Dealers Everywhere.

MORE QUALITY for LESS MONEY

NO Adjustments
Motor Troubles
NO Electrical Wiring
Battery Expense



\$6

The Handphone

Three Year Guarantee

Hear and inspect one, compare it with others and judge for yourself. The Most Efficient Hand Horn Made.

Automobile Supply Mfg. Co. 220 TAFFE PLACE BROOKLYN, N. Y.

HOLLEY CARBURETOR

NO MOVING PARTS
ONLY ONE ADJUSTMENT

WRITE FOR
PARTICULARS

Holley Brothers Co.
Detroit Michigan



Prime Your Engine with Prest-O-Lite to start easily \$4

Acetylene priming is indispensable with any method of starting, ensuring quick and easy starts in any weather. Saves the mechanism —saves your arm. The Prest-O-Primer is easily and quickly attached to any car. Write for details.

The Prest-O-Lite Co., Inc. 233 Speedway Indianapolis, Ind.

HOUK Detachable WIRE WHEELS

"The wheel that makes any car modern"

GEORGE W. HOUK COMPANY
1702 Elmwood Avenue, Buffalo, N. Y.

PREVENTS BLOWOUTS!



It regulates tire pressure, prolongs the life of new tires and insures the old ones. Enables you to carry standard pressure of air in your tires during the hottest day without danger of blowouts.

MYERS TIRE SAFETY VALVE

It releases the extra pressure caused by expansion from heat or friction. County and state agents wanted everywhere. We can make immediate deliveries. In order to get the right kind of dealers we demand a small investment.

W. M. MYERS
614 Postal Telegraph Bldg., Chicago, Ill.

Wisconsin CONSISTENT MOTORS



Dependability

After all it is the motor that keeps on going that makes automobiles and motor trucks a success. Wisconsin Motors, both the auto type and the truck type, have proven that they are

ABSOLUTELY CONSISTENT

You can always rely upon them. You can always be sure that you will keep on going. When you hear one running—(and they operate so quietly that it's hard to hear them) you never hear that disagreeable "thump" which accompanies the operation of so many motors—you hear nothing but the rhythmic purr of a perfectly constructed motor.

Complete Catalog upon request

WISCONSIN MOTOR MFG. COMPANY
Milwaukee, Wis.
Sta. A-D-47

MORE MILES
—LESS GAS

When Writing to Advertisers, Please Mention Motor Age.

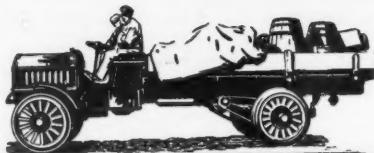
ZENITH CARBURETOR

For seven years the unchanging standard of quality motor vehicles

Detroit
U.S.A.



Built for your business



In the selection of a Motor Truck, there are three important elements to be considered:

- 1st—Its adaptability to the duty required of it.
- 2nd—The construction and record of the truck.
- 3rd—Permanency and responsibility of the makers.

Each of these essentials is satisfactorily met in KisselKar Trucks. Investigate—ask for illustrated portfolio.

Kissel Motor Car Co., 121 Kissel Ave., Hartford, Wis.

KISSELKAR TRUCKS

“BRIDGEPORT”

TRADE CO. U.S.A. MARK

TIRE PUMPS

Are easy to use and easy to sell. They are durable and efficient and are widely advertised. The cylinders are of seamless brass tubing which cannot rust. The "Stapley," the "Aeolus," "Windjammer," etc., give lasting satisfaction. Carry them in stock.

Bridgeport Brass Company
P. O. Box A Bridgeport, Conn.

Write
to-day for our
Territorial Agreement
on the

New \$1000

Inter-State “FOUR”

The one popular priced car with the greatest selling arguments in the country.

Inter-State Motor Co.
802 W. Willard St.
MUNCIE, IND.

The Clearing House of the Motor Car Industry

*For Second Hand Cars, Surplus Parts, Accessories, Tires,
Machinery & all other Special Announcements of a Similar Character.*

ADVERTISING RATES $\frac{1}{2}$ inch—One time \$2.40. 1 inch—One time \$4.50. $1\frac{1}{2}$ inches—One time \$6.75. 2 inches—One time \$8.75.
Rates for other spaces and longer terms furnished upon request.

CARS FOR SALE

As agent for the bank, I have several new Premier Wieldley touring cars for sale. Equipment is complete per catalogue. Manufacturer's price \$2,700. Our price \$1,750, subject to prior sale.

L. A. POUNDSTONE, Fiscal Agent
1443 Prospect St. Indianapolis, Ind.

FOR QUICK SALE

1913 7-passenger Stoddard-Dayton Touring Car, just overhauled, entire car in tip top condition. Tires all fine. Electric lights and horn. Painted green with red hair line stripe. An ideal car for lively purpose. Will sacrifice at \$650.

PALMER SALES COMPANY
Grand Rapids, Mich.

FOR SALE AT BARGAIN PRICES

Three 1 $\frac{1}{2}$ ton White passenger trucks (capacity 25 people). With special bodies, extra equipment and pay boxes, etc.; cost retail about \$4,500. Practically new, run irregularly for six months. If you could see them you would buy them. Address

GUY C. STOLTZ
Care Marion Motor Car Co., Marion, Ohio

FOR SALE OR EXCHANGE

Mitchell 35 H. P. Torpedo Roadster. Just been rebuilt, new wind shield, gas tank, lamps, rear tire holder, trunk rack, large gasoline tank on rear, five good tires and tubes, electric horn; strictly fine shape. Will sell cheap or accept a late model touring car. Address

M. G. ALSEVER
Center Junction Iowa

FOR SALE—Pope-Toledo; would make splendid truck; chain drive, powerful motor, cylinders reground and new heads and rings fitted this summer; good tires, 2 new this season; any demonstration; cheap for cash. Dan Toy, Sidney, Ohio.

FOR SALE—Studebaker 20 Truck, closed body.....\$250.00
Studebaker 20 Roadster.....195.00
Both in A1 running condition.

PEERLESS TIRE & RUBBER CO.
Louisville, Ky.

GET OUR LATEST BULLETIN OF USED CARS

You will surely find one to fit your requirements. You can get from us good, serviceable machines of various makes for \$400 and up. Let our reputation be your guide.

PACKARD MOTOR CO. OF CHICAGO
2367 Michigan Ave., Chicago, Ill.

GUARANTEED AUTOMOBILES—ANY MAKE at your price. Write us your wants. Engines, Axles, Bodies—anything at prices that will surprise you. Satisfaction or money back.

PROGRESS BROKERAGE CO.
527 Grant Street Buffalo, N. Y.

Marion, 5-passenger, fully equipped, torpedo body, electric lighted and up-to-date in every way. Will sacrifice if taken at once.

CONDON. 2635 Wabash Ave., Chicago, Ill. Calumet 5311

Matheson

Cars and Repair Parts

FRANK F. MATHESON, Wilkes-Barre, Pa.

Mitchells Rebuilt, Guaranteed
These cars are fully equipped. Call or write
for further particulars.
MITCHELL AUTOMOBILE CO.
2334-36-38 Michigan Ave., Chicago, Ill.

ONE 20 H. P. WHITE STEAMER
One 40 H. P. White Steamer; one 30 H. P. White gas car. Address

Box E 191, care Motor Age

Special built speedsters; speed very fast, price \$1,500; also will consider your old car as part payment. Write for full information to
G. J. G. MOTOR CAR COMPANY
White Plains, N. Y.

CARS WANTED

TEXAS FARM LAND

For a Serviceable Auto

Will take a serviceable auto as part pay on a 160-acre farm at \$15.00 per acre. Farm is level and fenced, on a good road 5 miles from a thriving town; best of soil and big crops on each side.

A Big Bargain at the Price
A. L. STONE Texline, Texas

HELP WANTED

WANTED—A Mechanic in your locality, one familiar with soldering. Good job for right man.

INTERNATIONAL METAL CO.

1719 W. Van Buren St., Chicago, Ill.

MACHINERY

50 LINCOLN MILLING MACHINES

\$50.00 Each

Send for photo and description

LUCAS & SON, 5 Fox St., Bridgeport, Conn.

MAGNETOS

MAGNETOS REPAIRED BY A MAGNETO SPECIALIST. Expert on Bosch, Eisemann, Remy. Magnets bought, sold, installed and repaired at short notice. Agent for N. Y. Coll Co. **GENERAL MAGNETO REPAIR CO.**

256 Halsey St., Newark, N. J.

We are the oldest and largest repair shop in the country. Our experience and knowledge is at your service. Let us know your troubles and get our prices on repairs; also on new and used magnetos.

PELLET'S MAGNETO EXCHANGE
1606 Michigan Ave., Chicago, Illinois

MAILING LISTS

Ask for Special Price List

Auto Owners, Ford Owners, Ford Dealers, all other dealers, Garages, Repairs, Supplies, Manufacturers, Jobbers, anything pertaining to the Auto Trade.

Auto List Dept. **A. F. Williams**, Mgr.
166 West Adams Street **CHICAGO**
Phone Franklin 1182

MAILING LISTS AND STATISTICS. Owners or dealers; any state, county, city; weekly and monthly supplements at lowest prices. Special lists of electrics, trucks, Fords, Studebaker, Overland, etc. **MOTOR LIST CO. OF AMERICA**, 1107 Locust St., Des Moines, Iowa.

MOTORIST'S BOOKS

"THE MODERN MOTOR CAR"
Just off the press—512 pages covering all phases of the Motor Car. 170 pages on Electric Starting and Lighting. Send for sample pages.

LAIRD & LEE, Inc.
1732 Michigan Avenue **Chicago, Ill.**

THE PRACTICAL HAND BOOK
of Gas, Oil and Steam Engines.
Send for complete circular.
CHARLES C. THOMPSON CO.
1130 S. Wabash Avenue, Chicago, Ill.

THIS BOOK ANSWERS 1001 MOTOR TROUBLES

Contains Motor Laws of Every State
Valuable Lubricating and Oil Charts
It is called the Motorists' First Aid Hand Book.
It fits in your coat pocket. Is handy and compact.

Price Only 75c
Sent postpaid Stamps accepted
AUTO MERCURY PUBLISHING CO.
Candler Bldg., 220 W. 42nd St., New York

MOTORIST'S CLOTHING

FUR LINED OVERCOATS

Limited quantity Manufacturers' samples.
Black broadcloth outside, lined throughout with
Mink dyed marmot. A beautiful Fur, like
Mink. Large Persian lamb collar. Making a
handsome coat suitable for Dress wear or driv-
ing. All sizes.

\$27.50

Would retail for \$60.
SENT ON APPROVAL
You take no risk. Examine and try on before
paying. Write today, stating size, enclosing
50c. for express charges only, and coat will be
sent at once. Few large size Fur robes, \$15
each, worth \$30.
E. HART, Dept. E, 3405 Broadway, New York

PARTS AND ACCESSORIES FOR SALE

A. A. A. A. ATTENTION A. A. A. A.
Selling out at one-half price the entire stock
of the Service Storage Battery Co., 6-60 to 6-150
lighting, igniting and starting batteries.
SIMPLEX BATTERY CO.
120 E. 33rd Blvd. **Chicago, Ill.**

The Clearing House—continued.

AAA SPEEDOMETERS AAA

Send for special price list of Speedometer Parts.
GENERAL SPEEDOMETER REPAIR CO.,
 53 W. 63rd St., New York City

AGENTS AND DEALERS

We announce a reduction of from \$20.00 to \$14.00 on our Spare Demountable Wheels for the Ford. We have some good territory left. Why not handle an original line. Carry extra wheel with tire on ready and interchangeable with any of present wheels. Can install outfit at home, then change wheels in less than two minutes. Write for catalogues. Legitimate dealers, get our agency for Spare Wheels, Spring Radius Rods, Fenders, Radiators, Cradles, etc. "ANGIER'S," Dept. B, Streator, Ill., U. S. A.

ALL PARTS IN STOCK AT DISCOUNT

Atlas, Bergdall, Chalmers, Ewing, Alco, Packard, Hudson, Herreshoff, etc. Brown-Lipe Gear Parts. Continental Motor Parts. STA-RITE Rings, \$1.00 each. Regular Piston Rings, 80c each.

JOS. C. GOREY & CO.,
 354 W. 50th St. New York City

ALL SEASON'S RECORDS MADE WITH
 Schebler equipment. Why not get a Schebler model R for your car? Our exchange proposition makes it easy.

J. C. NICHOLS, Direct Factory Distributor

1673 Broadway New York

AMERICAN UNDERSLUNG PARTS AND REPAIRS

Exclusive Sales Representatives for Manufacturers who supplied Motors, Axles, Wheels, Transmissions, Steering Columns, Control Levers, etc., etc., to the

American Motors Company
 Write for prices on parts needed in connection with American cars.

V. A. LONGAKER COMPANY
 INDIANAPOLIS, IND.

American Underslung and Marion

Motor Car Parts and Service
CHARLES E. RIESS & CO., Inc.
 1690 Broadway, New York

ATLAS AND ELMORE PARTS

We have purchased the jigs, tools, drawings and can supply immediately parts at less than cost to manufacture. Order now—20% off.

AUTO PARTS & REPAIR CO., Springfield, Mass.

ATTENTION, HENRY OWNERS

We are prepared to fill orders promptly for repairs for Henry cars.

MUSKEGON AUTOMOBILE CO.
 Muskegon, Mich.

AUTO DEALERS AND GARAGES

We have special offer to make on 10,000 spark plugs. Get our prices on anything required.

WESTCHESTER ACCESSORIES CO.
 1777 Broadway New York City

AUTOMOBILE PARTS

MICHIGAN, MORA AND DRAGON PARTS IN STOCK

We maintain a complete stock of parts for the above cars.

PHILADELPHIA MACHINE WKS.

67 Laurel Street, Philadelphia, Pa.

AUTOMOBILE REPAIR PARTS

Send broken parts—we will duplicate promptly. TIRES, what size? We save you money—try us.

AUTO PARTS CO.
 1404 Henn. Ave. Minneapolis, Minn.

AUTO TOPS BUILT and REPAIRED

Seat covers and body building, remodeling and trimming. Write for prices.

BITELY TOP & BODY CO.
 1342-4 W. Jackson Blvd. Chicago, Ill.

Auto Accessories

AND

Parts

SMASHING REDUCTIONS

BY THE

World's Largest Dealers

Send for our Price Wrecker (catalogue) that quotes on all supplies for autos at greatly reduced prices; we have the only complete, clean, up-to-date stock of parts that can be inspected properly; the largest buildings in New York and Chicago devoted to this business.

The following are only a few of our bargains:

Hartford shock absorbers, \$5 each; Remy dual system magnetos, complete, \$25; Prest-O-Lite tanks, style "B," charged, \$12.50; Disco self-starters, \$5; electric horns, complete, with wire and push buttons, \$1.05; mechanical horns, \$3.75; electric side lamps, \$2.75 per pair; Hudson "20" radiators, \$25; Buick, type 10, radiators, \$24; four cylinder new motor, 38 h. p., \$165; also bodies, transmissions, axles, gas and electric head lamps, wheels, oilers, Gray & Davis searchlights, tops, windshields, tires, etc.

WORLD'S LARGEST DEALERS

TIMES SQUARE AUTOMOBILE CO.

1210 Michigan Avenue, Chicago
 S.W. Cor. 56th & B'way, New York

AUTO SALVAGE COMPANY

1436 Wabash Ave., Chicago, Ill.

2-Cyl. Buick parts. Bosch D. U. 4 Dual Magneto, \$35.00; D4 Bosch, \$35.00. 60 H. P. Thomas Engine, with Bosch Magneto, \$150.00. 20 H. P. Stoddard-Dayton transmission, \$30.00. D6 Bosch Mag., \$45.00. Type 10 Buick parts. 7 cyl. Maxwell power plant, \$70.00. Pope-Toledo parts for sale, 25 H. P. Oswald eng. with mag., \$90. 28 H. P. Regal motor, \$100. 9 K Stoddard-Dayton motor, \$150.

AUTOMOBILES, BODIES AND PARTS

New and second hand for many makes of cars for sale cheap. Write us when in need of parts.

GEO. SCHMITZ & BROS.
 666 Genesee St. Buffalo, N. Y.

AUTO TOPS AND RACING SEATS

Mohair Tops for runabouts, \$20.00; Mohair Tops for touring cars, \$30.00; Racing Seats, per pair, \$18.00. **AMERICAN AUTO TOP MFG. CO.**
 1451 W. Washington Blvd., Chicago, Ill.

AUTO USERS

Save your blankets, coats, etc., from thieves. Our Auto Lock fastens them securely to the robe rail. Saves dollars.

VALIER SPECIALTY CO.
 923 South 55th St. Philadelphia, Pa.

BATTERY BARGAINS

6-80 Batteries, \$6.00 each (only 12 left). We carry all sizes. Write for prices.

THE AMPVO BATTERY CO.
 3031 Michigan Ave. Chicago, Ill.

BALL BEARINGS REGROUND

We guarantee them as

GOOD AS NEW

All sizes and makes in stock ready for immediate delivery—At prices that will interest you.

AHLBERG BEARING CO.

2636 Michigan Ave., Chicago, 1790 Broadway, New York, 805 Woodward Ave., Detroit, 98 Massachusetts Ave., Boston, 1841 Euclid Ave., Cleveland, Ohio, 325 W. Pico St., Los Angeles, Cal.

CeCOS and Carpet Mats, Hand Made Seat Covers, Auto Tops Built and Repaired.

AUTO CAPE TOP CO.

2334 Michigan Ave. Chicago, Ill.

CUT PRICES

Send for our illustrated cut price auto supply catalogue.

Liberty Tire & Supply Co.
 100 Chambers St. New York, N. Y.

DESIGN FOR LIGHT CAR

The designer of three successful cars will sell a limited number of complete sets of prints for a four cylinder light car. Shaft drive and handsome and up-to-date design, composed of standard units easily obtained and reasonable prices. Complete set of prints, list of parts and where obtained for \$5.00. Money returned if not satisfactory. Send for information and sketch of car.

Fenton Engineering Co., Fenton, Mich.

DETACHABLE TONNEAU

Get Our Circular

"THREE FORDS IN ONE"

FORD DELIVERY BODIES

Racing Bodies and Bucket Seats

AUTO REMODELING CO.

1501-5 Michigan Ave. Chicago, Ill.

F. & H. WIRE WHEELS

Equipped with F. & H. Special Wire Wheel Rims. Adaptable to any car. Complete equipment for Ford cars.

THE F. & H. WIRE WHEEL CO.
 Columbus, O.

Ford Combination Primer and Gas Saver

operates from the dash. Starts car on coldest days. Something new; worth \$5.00. Sent prepaid for only \$1.00. Agents wanted.

THE BROWNE SUPPLY COMPANY
 Toledo, Ohio

FORD DELIVERY BODIES

12 styles, all sizes. Agents wanted everywhere.

COLUMBIA BUGGY CO.
 21-23 Selden Ave. Detroit, Mich.

FORD OWNERS

Equip your cars with Seat Covers. Our direct to car-owners plan will save you money. Ten thousand satisfied customers last year.

GLOBE SEAT COVER CO.

Dept. M. RACINE, WIS.

FORE DOORS

RACING SEATS

You can get complete doors and panels from us at a reasonable price.

GET BUSY AND MODERNIZE YOUR CAR

Write for prices. We have all patterns. We also make racing seats, bodies, radiator covers, etc., etc.

CHICAGO AUTO BODY CO.

1627 Michigan Ave. Chicago, Ill.

The Clearing House - continued.

EARLY WINTER BARGAINS

LESS 5% FOR CASH WITH ORI ER

6 cyl. Maxwell motor, cast en-bloc.....	\$180.00
Michigan 40 4 1/4 x 5 1/4-in. motor with cooling fan and carburetor, each.....	140.00
Cameron 4 cyl. A. C. used motor.....	40.00
Premier 4 cyl. A. C. motor.....	40.00
Reliance truck motor, 5 1/2 x 5 1/2-in.....	60.00
Garford 4 1/2 x 5 1/2-in., just overhauled.....	150.00
Continental 4 1/4 x 4 1/2-in. with fan, overhauled.....	95.00
4 cyl. Knox A. C. motor with fan.....	65.00
New 2 cyl. opp. 2 cycle with carburetor.....	35.00
Badger 4 cyl. motor, 2 1/2 x 3 1/2-in. with fan.....	75.00
9 American 6 cyl. castings in the rough.....	10.00
10 American crank cases for above.....	10.00
American Scout motor crank case, machined.....	18.00
Brown-Lipe trans., 40 H. P. side levers, used.....	45.00
Brown-Lipe trans. with center levers.....	50.00
New American 30 trans. with levers.....	46.00
Holley carburetors, shop worn, 1 1/4-in.....	2.50
Model D 1 1/4-in. Schebler Carburetor, shop worn.....	4.50
Model L 1 1/4-in. Schebler Carburetor, shop worn.....	5.00
Vortex 1 1/4-in. vertical carburetor.....	6.00
Rayfield carburetors, model H4, used.....	8.00
Model H3X, shop worn.....	13.00
Oldsmobile radiators.....	31.50
Model 19 Buick radiators.....	22.50
Model 10 Buick radiators, (send pattern for price on other radiators).....	26.00
Lewis and Weston-Mott full floating 60-in. tread axles with hubs and caps, per pair.....	80.00
Weston-Mott semi-floating axles with hubs and caps.....	40.00
Pressed steel frames, 10 sizes.....	\$3.00 up
100 2-in. scroll elliptic springs, 6 leaf, per pair.....	5.00
150 three-quarter elliptic 2-in., 49 1/4-in. long, each.....	4.00
500 half elliptic 1 1/4 x 31 in., 5 leaf, each.....	1.50
500 1 1/4 x 33 1/4 in., 4 leaf.....	1.40
5,000 spring clips, 2x3 in., per C.....	6.00
(Other sizes in proportion.)	
Spring bolts with grease cups, 1 1/2 x 3 1/2 in., each.....	.30
Spring bolts with grease cups, 5/8 x 4 1/2 in., each.....	.35
1,000 pieces 2x9 1/2 in. brake band lining, each.....	.08
Ward Leonard electric generator and controller.....	30.00
Apelco electric generator with cutout.....	30.00
Tire saver jacks, per set of 4.....	2.00
E-Z gas starter less tank, each.....	2.00
Dann's spring insert, all sizes in stock, 1 1/4 in. and 2 1/2 in. square, per foot.....	.15
Remy RD coil with switch.....	8.00
4 cyl. Elsemann magneto with coil.....	35.00
U. & H. 6 cyl. magneto, H. T......	25.00
One-piece folding windshield, 20x41 in., nickel.....	9.00
Folding windshield, 26x41 in., black enameled.....	6.00

If You Have Not Received Our Late Bulletin
Write Today
DEPT. O

AUTO PARTS COMPANY
737-39 W. Jackson Blvd. Chicago

FORE DOOR BODIES

1914 Models, five-passenger, fully upholstered; fit most any car. Cost \$350.00, our price, while they last, \$85.00. Write for full description.

THE M. & M. COMPANY
480-500 Prospect Ave., Cleveland, Ohio

FOR SALE

A small number of modern, well designed and constructed six, five and four-passenger touring bodies and comfortable roadsters painted and trimmed. Will change and guarantee to fit your car. Write us.

IRVIN ROBBINS & CO.
Industrial Building, Tenth and Canal
Indianapolis, Ind.

FOR SALE AT A BARGAIN
New 5x6 four-cylinder, governor-controlled engine, fully equipped, with carburetor, magneto. Will sell for much less than cost. FRED HANSON, 570 Prior Ave., St. Paul, Minn.

FOR SALE—Model N Ford motors, transmission complete ready to run, \$80.00. Front and rear axles with wheels, \$30. Frame, \$6. Special steering gear, \$6. Model T radiator, \$10. Racing body and bonnet, \$18.

Address Box E 231, care Motor Age

FOR SALE—3 New Deco Electric Starting and Lighting Outfits complete for the Model T Ford. Price \$50.00 each.

FORD MOTOR AGENCY
Attica, Ind.

FOR SALE

Send for our monthly bargain list covering electric ammeters, generators, motors, lamps and parts. New and used stock of interest to all automobile and motor boat repairmen.

THE ESTERLINE COMPANY
223 E. South Street Indianapolis, Ind.

FOR SALE

Winter bodies, brougham and landau, \$250 to \$600. Pierce, Thomas, Studebaker and others.

PIERCE-ARROW SALES CO.

Buffalo, N. Y.

GUARANTEED RADIATORS

You need a strong, well built radiator these winter days.

HONEYCOMB RADIATORS

Ford T.....	\$25.00
Hupp.....	25.00
Buick 10, 24, 25, 34, 35, 36.....	27.50
Buick 16, 17, 19, 20, 27, 28.....	37.50
Buick 21, 38, 39, 43.....	37.50

FIN AND TUBE RADIATORS

Ford T.....	\$20.00
Buick 10.....	25.00
Buick 24, 25, 34, 35, 36, B24, 25.....	22.50
Buick 16, 17, 18, 39.....	31.00
Buick 19, 27, 28, 43.....	28.00
Buick 21.....	30.00

Will ship on telegram same day C. O. D.

Detroit Radiator & Specialty Co.
963 Woodward Ave. Detroit, Mich.

GUARANTEED RADIATORS

Not always necessary to buy new radiators. New cores can be furnished for frozen or damaged radiators. We build the fin and tube type. Guaranteed copper fins and tube.

We also repair and furnish new cores for Maya radiators.

We build new cores for all makes and for all cars. Get our prices. You will save money.

Cores in stock for many standard radiators such as Hupps, Warrens, Herreshoffs, Buicks, E. M. F. 30, Studebaker, Hudson 20, Cadillacs and several others.

We can build and fit a new core in your radiator in two days—it is stock, in one day.

Write for bargain sheet of accessories.

HURON RADIATOR & LAMP CO.
253-255 Jefferson Ave., Detroit, Mich.

Terms cash with the order.

JOBBERS AND GARAGES

Get our proposition on fibre gears for all makes of speedometers. We make anything you want from fibre.

OGDEN FIBRE GEAR & TIRE CO.

Columbus, Ind.

J. M. SHOCK ABSORBERS

25 per cent discount to reduce stock.

Write at once.

Address Box E 250, care Motor Age

LATEST TYPE FOUR CYLINDER FORD COILS COMPLETE. We have replaced these coils with magnetics and will sell a limited number at \$12.50. All coils practically new, having been used less than one month.

KNUCKEY-MYSING AUTO CO., Laurel, Miss.

Inventory Sale

Auto Parts and Accessories

10-in. Black and Nickel Gas Headlights. 11 1/2-in. Black and Nickel Oil Sidelights. 9 1/2-in. Black and Nickel Oil Tail Lamps. Complete set, 5 lamps, for.....\$8.00

Mohair Touring Car Tops, with Collins adjustable side curtains, slip cover and windshield straps, made to fit Model 26 Chalmers cars, complete.....\$25.00

M. & M. Ford Shock Absorbers, ride easier and smoother than any other make, double spring enclosed. Price per set of four.....\$7.50

Weston-Mott Rear Axles.....\$50.00 I-Beam Front Axles.....15.00

Splidorf Magneto, Model D-F and X, 4-cylinder.....10.00

Simms Magnetics, 4-cyl., high tension, dual, with coil and lock switch.....35.00

AUTO ENGINES

Owen—4 cyl., 50 H. P.\$250.00

Howard—6 cyl., 50 H. P.400.00

Garford—4 cyl., 40 H. P.95.00

Model, 4 cyl., 25 H. P., with trans. 125.00

American-British, 4 cyl., 22 H. P., unit with transmission and clutch 135.00

Write for Full Information

THE M. & M. COMPANY

500 Prospect Ave., Cleveland, O.

Do You Want Our General Catalog?

It's Yours for the Asking

KEEP YOUR CAR LIKE NEW

all season. By using our famous KEEP BRIGHT DUSTER. We guarantee this duster or we will refund your money. Polishes Auto Bodies, Fenders, Wind Shields, Lamps, etc.

50 Cents Prepaid

North American Sales Company

1123 13th Ave.

Moline, Ill.

LET US SEND A GOOD TOP for your runabout for \$14, or touring car for \$27. Send for Catalog.

Bison Trimming Co., Buffalo, N. Y.

MAXWELL OWNERS AND REPAIRMEN

Why pay 20% advance for your repair parts for the old models of MAXWELL cars? We can supply 90% of your wants at the old list price. Transmission gears and parts in stock for Cadillac, Case, Croxton, Dorris, Elmore, Moline, Moyer, Overland, Regal, Selden, Standard, Velle and 75 others at cut prices. Why pay more? Send for price list.

M. P. SUPPLY COMPANY

Atlanta, Georgia

The Clearing House—continued.

We Make Ford Racing Type Bodies
In several models for immediate delivery
AUTO SHEET METAL WORKS
1532 Michigan Ave. Chicago, Ill.

We Tear 'Em Up and Sell the Pieces

We can save you money on Repair Parts or Supplies for your Auto.

Can supply you with Crank Cases, Crank Shafts, Cam Shafts, Cylinders, Pistons, Connecting Rods, Radiators, Gears (any style), Timers, Magneto, Coils, Carburetors, Manifolds, Water Pumps, Transmissions, Rear and Front Axles, Wheels, Steering Gears (complete), Steering Wheels, Gasoline Tanks, Wind Shields, Springs, Bodies, Seats and Cushions, Jacs, Tires and Tubes, Head Lamps, Side Lamps and Tall Lamps (any style), Prest-O-Lite and Search Light Tanks, Horns, Mufflers—in fact, any part of an auto.

We also buy old autos—condition no object—or any part of an auto, or if you want to trade parts we will trade with you.

OUR GUARANTEE TO ALL—if not satisfied with your bargain, return and we will refund your money.

SPECIAL BARGAINS

New Ford Wheels, 30x3.....	\$ 2.00
Rain Vision Wind Shields, brass finish.....	10.00
Electric Horns with cord and push button.....	2.50
Ump Timer, 2 and 4 cyl., new.....	2.00
Spitdorf Magneto.....	15.00
Mercedes Type Radiators.....	12.50
Electric Tall Lamps.....	1.25
Comb. Trunk and Tire Holder.....	1.50

Send for Our Motor List

AUTO WRECKING CO.
Old Church, 13th and Oak
KANSAS CITY, MO.

YOU CAN CHANGE YOUR CAR
into raceabout yourself. We furnish radiators, hoods, seats, tanks and fenders. Get our prices.
AUTO SHEET METAL WORKS
1532 S. Michigan Ave. Chicago, Ill.

\$5.00 HOOD COVERS FOR FORDS \$2.50 DELIVERED

Detroit's Oldest Department Store offers an exceptional bargain in Hood and Radiator Covers for Ford Cars. Made of very best material, heavy thick quilting. We will send one prepaid for \$2.50, and if it is not the equal of any \$5.00 cover, you may return it at our expense. Dealers, send \$2.50 for sample, then get our dozen proposition.

Heyns Bazaar Detroit, Mich.

\$600 TAKES 1913 \$2,500 KIMBALL LIMOUSINE
Body taken from 1913 Locomobile; no trade; no terms.

MR. M. MERGENDOLLAR
Hotel Haynes, Chicago, Ill.

PARTS AND ACCESSORIES WANTED

Will purchase spot cash
Spark Plugs or other Ford Specialties
Job Lots Desired
GEORGIA AUTO SUPPLY CO.
Athens, Georgia

PATENTS & PATENT ATTORNEYS

C. L. Parker, Patent Attorney

Formerly member Examining Corps, U. S. Patent Office, 960 G St., Washington, D. C. Pamphlet of instruction sent upon request.

PROTECT YOUR IDEAS

Send for free book and free search plan.
MILO B. STEVENS & CO.
53 W. Jackson Blvd., Chicago
Established 1864 Main office, Washington

RADIATOR AND LAMP REPAIRING

A. A. A. Radiators Manufactured

Any make repaired and returned same day. Radiators to fit any car shipped in three days. New cores replaced in any make radiator. All work fully guaranteed. **SHEPPARD CO.**, 1331 W. Jackson Blvd., Chicago, Ill.

ALL OUR RADIATOR REPAIRING GUARANTEED. New Radiators, Hoods, Fenders, Tanks and New Cores installed in old radiators at bargain prices.

ILLINOIS AUTO SHEET METAL WORKS
58-60 E. 16th St. Chicago, Ill.

AMERICAN AUTO SHEET METAL WORKS
We are masters of the trade. Manufacturers of Radiators, Hoods, Fenders, Gas Tanks, etc. Repairing a specialty.

1446 Wabash Ave., Chicago, Ill.

CHICAGO MFG. CO.

1466 Michigan Avenue, Chicago

We are the only radiator manufacturers in Chicago making a square tube radiator. New guaranteed cores placed in old radiators. We also manufacture Hoods, Fenders, Tanks and Pans and do guaranteed repair work. Prompt service.

DULUTH AUTO RADIATOR AND LAMP REPAIR WORKS

We repair burnt, frozen and wrecked radiators; also auto fenders; hoods and tanks made to order. Shipments promptly taken care of.

336 E. Superior Street Duluth, Minn.

ONLY RADIATOR FACTORY IN NORTHWEST

Pioneer manufacturer. Why send your radiator down east when you can ship it to us; save time, express, freight, money, and get best workmanship. Prices right. Make new radiators, allow for old one.

TODD MANUFACTURING CO.
820-824 Mary Pl. Minneapolis, Minn.

REBUILDING AND REPAIRING

A. A. A. SCORED CYLINDERS

We fill your deep scored cylinders with a silver composition by our patented electric filling process. Remember! We also do a large welding business.

L. LAWRENCE & CO.
Newark, N. J.

ANDRE G. CATELAIN

Eveready Automatic Engine Starter. General machine work for foreign and American cars. Welding of all metals. Manufacturer Catelain Hose Coupling.

1446-8 Indiana Avenue Chicago, Ill.

CYLINDER GRINDING

on automatic machinery by skilled mechanic at prices that will interest you. Gears, axles, valves and parts of all kinds made of high grade alloy steel. Send us your worn or broken parts and we will replace them. Oxy-Acetylene welding of cracked cylinders a specialty.

ADAPT MACHINERY CO.
1624 So. Wabash Ave. Chicago, Ill.

CYLINDERS REBORED AND REGROUND

Fitted With My Light Cast Iron Pistons

40% to 100% lighter than standard, and with my new rings, makes a four run like a six, with a guaranteed gain in efficiency of from 25% to 50%.

McCADDEN MACHINE WORKS ST. CLOUD, MINN.

CYLINDER REBORED

Including piston and rings.....\$7 to \$11
STERLING ENGINE CO.
331 So. Clinton Street Chicago, Ill.

CYLINDERS REBORED

Pistons and Tight Rings Furnished. General overhauling, crankshafts manufactured. Quality guaranteed. Prices interesting.

HOPE MACHINE CO.

2310 N. Second St. Philadelphia, Pa.

CYLINDERS REGROUND

and fitted with new pistons and rings for \$7 to \$11 per cylinder. We do this class of work exclusively and are thus able to give you the highest class of work at these prices. Oxy-acetylene welding done at reasonable prices.

CROWN MACHINE SHOP

Crown Point, Ind.

CYLINDERS REGROUND

PRICES \$5.00 TO \$10.00 PER CYLINDER
OHIO GRINDING WORKS
34 S. St. Clair St. Dayton, Ohio

MR. MOTORIST

If you take particular pride in the operation of your motor, and you certainly should, YOU should investigate the claims I make for my extra light pistons and connecting rods and my special design piston rings. All these parts being designed with the special idea of increasing the efficiency and decreasing the noise and vibration of your motor.

CYLINDERS REGROUND ABSOLUTELY ACCURATELY

Lee W. Oldfield MINNEAPOLIS MINNESOTA

WE REGRIND CYLINDERS

Furnish our heat treated piston rings and pistons. First-class equipment, 15 years' experience. Write for our prices.

BRIDGEPORT PISTON RING CO.

Bridgeport, Conn.

SCHOOLS

FREE BOOKLET

"How to Succeed in the Automobile Business," on application. A Greer diploma guarantees efficiency. Largest motor college in the world—1,400 graduates—\$40,000 in modern equipment—eight instructors—actual work, repairing and driving—Day and evening classes—many owners and dealers employ Greer graduates only.

GREER COLLEGE OF MOTORING
Chicago's "Safety First" Automobile School
1456 Wabash Ave. Chicago

The Clearing House—continued.

Become a Tire Expert

Learn Vulcanizing by Our Method

Tire business offers greatest opportunities in the auto industry

We teach you every phase of tire and tube repairing in an unlimited course.

Actual shop work on hundreds of different tires and tubes.

No "punk" diplomas or paper exams. We give you the experience and training you must have to start your own business or get a good position.

Experts needed in every town and city in the country.

EASY LESSONS EASY PAYMENTS

CALL OR WRITE

Lakeside Vulcanizing Shops
4703 Sheridan Road Chicago

F. G. LEE, Manager

GIVE US AN OPPORTUNITY TO SHOW YOU.

POSITIONS GUARANTEED

Hundreds of our graduates are now chauffeurs, repairmen, garage owners and factory experts; these men came to us untrained, but after a few weeks' training they went out of this school thoroughly competent and now have steady employment; we can do the same for you.

LEITZE AUTOMOBILE TRAINING SCHOOL
347 Franklin St. Buffalo, N. Y.

THE AUTOMOBILE BUSINESS
offers wonderful opportunities. We are placing men from all parts of the country in good paying positions. Send for Booklet "M."
STEWART AUTO SCHOOL
Chartered by N. Y. State Board of Regents
225 W. 57th Street New York City

STORAGE AND SHIPPING

P. BRADY & SON CO.
Trucking and Storage. Automobiles and Beddes Stored. Automobiles boxed for Export.
552-558 W. 58th Street, New York
Telephone 3440 Columbus

TIRES

AUTO TIRES—USED SLIGHTLY
300 34x4 tires, Q. D. Bought of manufacturer who used larger sizes for next year—\$8 each. Tubes \$2. Save \$8, one-third with order.
BENEDICT, 63 Winder St., Detroit, Mich.

BARGAINS—TIRES—BARGAINS
In Guaranteed, Seconds and Used Tires
Write for our prices
ACME TIRE REPAIR COMPANY
1547 Michigan Ave. Chicago, Ill.

BIG CUT IN PRICES ON TIRES
New, fresh stock.
Our price list will interest you.
SERLIN TIRE CO.
1073 W. 14th Pl., Chicago, Ill. Phone Canal 2191.

TIRE DEALERS—Send for our tire proposition. We have a tire that will make YOU independent of seconds for low priced tires. Send Today—NOW!
PEERLESS TIRE CO., INC.
304 West 54th St. New York, N. Y.

Englebert Tyres at Bargain Prices

We are overstocked on the few sizes shown below, and will sell them while they last at great reductions from our regular price. If you can use any of these sizes this is a rare chance to save money on your tyre bills. Englebert is the leading European Tyre and yields surpassing mileage.

These are not Seconds but Regular Stock and carry the full Englebert Guarantee.

30x3 1/2	36x4 1/2	810x 90
32x3 1/2	37x4 1/2	870x 90
34x3 1/2	35x5	815x105
32x4	36x5	875x105
32x4	37x5 1/2	915x105
36x4	38x5 1/2	820x120

Some Steel Studs but mostly Plain and Rubber Non-Skid Treads.

Write for prices today (giving size), as this small quantity will soon be snapped up and no more can be obtained at such low figures.

ENGLEBERT TYRE COMPANY
1928 Broadway New York

Make Two Old Tires

do the work of a new one. Send us two of our old casings, regardless of their condition; by our process we return you the two tires made into one ready for 2000 miles of actual service. We guarantee this mileage absolutely. We are doing it for others. Send us two old tires today, or write and ASK US HOW.

COWANS BROS.

150 W. 55th St. New York City

READ THIS TIRE GUARANTEE

3500 Miles—Or a New Tire Free

The only tire you can buy with a positive bona fide guarantee of 3,500 miles' service or another tire ABSOLUTELY FREE. Read this:

We guarantee this tire, No. ___, Size ___, to give you 3,500 miles of actual service. If for ANY reason you do not receive 3,500 miles of actual wear we agree to give you another tire fresh from our stock ABSOLUTELY FREE and make no charge for mileage already obtained.
30x3 ... \$10.95 33x4 ... \$20.75 35x4 1/2 ... \$27.90
30x3 1/2 ... 14.70 34x4 ... 21.50 36x4 1/2 ... 28.85
32x3 1/2 ... 15.65 35x4 ... 22.50 37x5 ... 34.25

Write for complete price list. 5% discount for cash with order. Order today direct from

CONSUMERS TIRE COMPANY
817 Hume Mansur Indianapolis, Ind.

TIRES!—Extra heavy type tires. They average 5,000 miles' service. 30x3, \$6.75, tube, \$2.25; 30x3 1/2, \$8.50-\$2.75; 32x3 1/2, \$8.60-\$3.00; 33x4, \$12.40-\$3.60; 34x4, \$12.50-\$3.75; 36x4, \$13.75-\$4.00. All other sizes, Skids, 10% additional.

TIRE SALES COMPANY Buffalo, N. Y.

WANTED—AGENTS & SALESMEN

MAKE \$2.00 ON EACH \$5.00 SALE

Every automobile owner buys. Glaresless glass just accepted by Chicago authorities. Beats everything. Motor Autolite, 404 First National Bank Building, Chicago.

WANTED—Salesmen at liberal commission to sell Ford Auto-Starter. County Agencies in any State west of the Mississippi River. The best mechanical starter ever invented. The **Buckeye Auto Starter Co.**, 57 Main St., Deshler, Ohio.

WELDING

A. A. A. WELDING BY EXPERTS

Broken crankshaft, crank cases, cylinders, flywheels, gear teeth, pistons, perfectly welded and machined, ready to replace; scored cylinders made new; booklet. **Atlas Welding Company**, 44 Elizabeth Ave., Rahway, N. J.

AAI WELDING OF ALL METALS

Cast iron and aluminum a specialty.

ADVANCE WELDING MACHINE COMPANY
525 W. Jackson Blvd. 111 N. Desplaines St.
Phones: Monroe 3937; Auto. 36-192. Chicago, Ill.

Absolutely Guaranteed Welding

We absolutely guarantee all work done by the OXWELD PROCESS of welding and cutting, including welding cracked or defective cylinders, crankshafts, housings, aluminum crank and transmission cases, etc., etc. Estimates furnished on job and contract welding and cutting of all kinds.

OXWELD ACETYLENE COMPANY
36th St. and Jasper Pl., Chicago, Ill.

OXY-ACETYLENE WELDING
Broken automobile crankshaft, aluminum cases, cracked cylinders and general machinery parts successfully welded by us. Estimates cheerfully given. Satisfaction guaranteed.

PIONEER WELDING CO.
610 E. Main Street Kalamazoo, Mich.

AUTOGENOUS WELDING
Expert welders on automobile parts. Manufacturer of the Galbraith Welding Torches.
C. SORENSEN
18 E. Sixteenth St. Chicago

WELDING
Cylinder, crankcase and crankshaft welded. Cylinders reborbed, \$7 to \$11 a cylinder, including pistons and rings.

STERLING ENGINE COMPANY
331-333 S. Clinton Street Chicago, Ill.

MISCELLANEOUS

WANTED—Names of FORD OWNERS. We pay \$5.00 per 100. Send 25 cents for contract blanks, particulars, instructions and outfit.

UNIVERSAL SYNDICATE
1123 13th Avenue Moline, Ill.

We Are Constantly in Touch
with employers requiring High-Grade Engineering service. Are you listed with the
TOLEDO ENGINEERING AGENCY
Toledo, Ohio.

We have on hand a number of back copies of several foreign and domestic motor trade journals. All are in good condition. Should you need copies of trade journals to complete your files, we would be pleased to correspond with you.

Please address Patent Department.

Packard Motor Car Company
Detroit, Michigan

Now on sale for \$1.25
THE BOOK FOR
EVERY MOTORIST

THE AUTOMOBILE CATECHISM

Regular price \$2.50

For further particulars write THE CLASS JOURNAL CO., 910 S. Michigan Ave., Chicago

Used with regular plugs they ignite the mixture at two points at once. They give a wonderful increase in power with less fuel. Easily installed; suit any ignition system. At your dealer's or by mail.

Superior Motor Specialty Co.

46 N. Fourth Street Philadelphia

DEALERS ATTENTION

Send for our 1915 Advance Supplement and get your name on our list for 1915 complete catalogue. Will be ready about April 1st.

CHICAGO AUTOMOBILE SUPPLY HOUSE
1355 Michigan Blvd. Chicago, Ill.



Classified Advertising

Rate 25¢ A Line

Cars For Sale

REMODELED RAMBLER, 40 H. P., ELECTRIC lights, electric horn, fore doors, 3 pt. suspension engine, sound tires, windshield, top. Trade for clear real estate. Box 258, Eugene, Ore.

4 PASS. ELECTRIC COUPE, CASH, TIME, trade for gas coupe. 3252 Kenwood, Ind'p'l's.

Cars Wanted

HAVE 80 ACRES OF LAND 3½ MILES east of Fairland, Okla., clear of incumbrance. Will trade, even up, for high class roadster; must be in good shape. Value \$2,000. W. J. Anicker, Muskogee, Okla.

Parts and Accessories FOR SALE

FOR SALE—CYCLECAR TWIN A. C. MOTOR, 12 H. P., complete Atwater ignition, Schebler plugs, mufflers; good as new; complete \$50.00. C. A. Florey, Beloit, Wis.

CYCLECAR CHASSIS, \$160.00, COMPLETE. For photo and description address Box 311, Fonda, Ia.

ONE 110-VOLT ¼ H. P. MOTOR AND KELLOG 4-cylinder combined tire pump; late make, good as new. Cost \$100.00. Sell for \$50.00 B. R. Noyes, Kearney, Neb.

Parts and Accessories WANTED

WANTED—A THOMAS SURREY (TERRAPEDO) BODY, 1912 style, upholstered, second hand, cheap. Give description. Lock P. O. Box 822, Greenport, L. I., N. Y.

Help Wanted

WANTED—CHAUFFEUR TO DRIVE SIMPLEX and Mercer cars; married man over 30 years preferred; must be expert mechanic and driver, willing to wear uniform; neat in appearance and used to late hours, if necessary. A thorough knowledge of Chicago and vicinity. Good references and temperate habits required. Apply Box 257, Yale Station, New Haven, Conn.

WANTED. A VULCANIZING MAN to take charge of well equipped shop. Give references also state salary. The H. T. Henderson Garage, Lethbridge, Alta.

Situations Wanted

EXPERIENCED ELECTRIC AUTOMOBILE garage foreman; capable mechanic and battery man. Will consider possible financial investment. Address Box E 252, care of Motor Age.

PROFESSIONAL A. A. A. RACING DRIVER wishes independent financial backer for 1915 season. Write for proposition. Address Driver, 305 Court St., Saginaw, Mich.

TEMPERATE AND RELIABLE AUTOMOBILE, vehicle, pictorial and machinery painter, stiper and letterer would like position. Can manage and estimate work. Address Box E 246, c/o Motor Age.

WANTED—A POSITION BY A FIRST-CLASS MECHANIC capable of taking charge of repair department or service station. R. H. Hill, 1406 Glendale Ave., Peoria, Ill.

MOTOR MANUFACTURERS AND DESIGNERS—Exceptional opportunities present themselves in the aviation motor industry. The advertiser who is sales manager for a well known aviation motor, desires to make a change and would like to get in touch with a company or individual who contemplates entering this field. To the right parties I can be of untold service. E. B. Wilken, 1138 N. Hoyne Ave., Chicago, Ill.

ENGINEER SUCCESSFUL IN DESIGNING motor trucks of all capacities and light pleasure cars is open for engagement. Ten years' experience. At present connected with prominent company. Box E 249, c/o Motor Age.

WANTED—POSITION AS GARAGE MECHANIC or truck driver. Six years' experience. A-1 references. Address Box E 247, c/o Motor Age.

Garages, Shops, Etc., FOR SALE

A BUSINESS OPPORTUNITY—A COMPLETE auto tire repair plant for sale. The largest and most up-to-date plant in this section. For further information write Box E-233, care of Motor Age.

FOR RENT—GARAGE FOR RENT IN THE prosperous town of Galva, Ill. Address reply to W. F. Nott, Galva, Ill.

FOR SALE AT INVOICE PRICE—GARAGE that has been running for the last six (6) years. Agency for the best line of cars on the market. Repair shop that keeps from three to six men busy at all times. Located in the heart of the Southern Minnesota farming district. Best of reasons for selling. Address Box E 243, care Motor Age.

FOR SALE AT A BARGAIN—GARAGE with full equipment, including Bowser pump machinery, oil tanks, vulcanizer, Prest-O and Searchlight service. Located on Lincoln Highway where hundreds of tourists pass every day. Building can be leased for 5 years. Average gas sales 1,500 gal. per week. A bargain at \$2,500. Address Box E 170, c/o Motor Age.

FOR RENT OR SALE—THE FINEST AND best equipped garage and machine shop in southern Iowa; fine place for auto distributing business. S. G. Hunter, Albion, Iowa.

Read
MOTOR
AGE



SPROCKETS
CHAINS AND DIFFERENTIAL
IN STOCK OR ORDER
SEND FOR NEW CATALOG

Cullman Wheel Co., 1341 Altgeld St.
Chicago



Racing Type ROADSTER SEATS

Adapted for any car; will make an old car up to date. Made of heavy gauge leaded steel, rolled edges, durable and comfortable. 16" wide, 17" deep, 21" high. Upholstered in black muleskin, pair.....\$23. Upholstered in leather, pair.....\$25. DEPT. O.

AUTO PARTS COMPANY
737-739 West Jackson Blvd.

CHICAGO, ILL.

Hoyt Electrical Instrument Works

Makers of

HOYT AMMETERS AND VOLTMETERS

Penacook,
New Hampshire



ONLY FOR DEALERS

Get the best hand-operated horn on the market—\$3.50 small size, \$3.75 large size.

It's new and it's different. Simple in construction, beautiful in design. Guaranteed for three years and money back if not satisfactory. Dealers, send us a trial order. The results will surprise you, for the horn is a winner and makes sales.

SERVICE MOTOR SUPPLY COMPANY
640 Washington Blvd.
Chicago, Ill.

MARMON
"The Easiest Riding Car In The World"

41"	48"
\$3250	\$5000
132" Wheelbase	145" Wheelbase

Nordyke & Marmon Company
Indianapolis (Established 1851) Indiana
"Over Sixty Years of Successful Manufacturing"

Ford Owners Gain from two to three miles on every gallon of gasoline by the use of the
Roper GAS SAVER

Satisfaction guaranteed or you may return at our expense and receive your money back. Price \$8.00.

C. F. ROPER & CO., Box M. A., Hopkinton, Mass.

GILBERT TIRE COVERS

Will add to your car's efficiency and appearance.

Will protect your spare tires until they are needed.

Will fit and wear well.

Made in all sizes and styles from materials of the highest quality.

Send for our catalogue
and sample book.

The Gilbert Mfg. Company

New Haven, Conn.

New York City Representative: E. G. BAKER, 1790 Broadway



Republic Motor Trucks

The Easiest Selling Line of Motor Trucks in America

3/4-ton with express body, internal gear drive	\$ 995.00
1-ton chassis.....	1350.00
1 1/2-ton chassis.....	1475.00

The Vitals of the Republic

1 AND 1 1/2-TON MODELS

Continental Motor	Russell Full Floating
Timken Axles	Jack Shaft
Bosch Magneto	Covert Transmission
Stromberg Carburetor	Standard Cone Clutch

Firestone Tires

No Better Units Built

We ask the opportunity to prove our statements.
Wire or write for catalog and complete information.

Republic Motor Truck Co., Alma, Mich.
(FORMERLY ALMA MOTOR TRUCK CO.)

Index to the

Atwater Kent Manufacturing Works 52c
Auto Parts Company 68 and 83
Automobile Supply Manufacturing Company 75
Automobile Trade Directory Cover

B. & L. Auto Lamp Company 69
Bosch Magneto Company 75
Braender Rubber and Tire Company 73
Brennan Motor Manufacturing Company 71
Brictson Manufacturing Company 73
Bridgeport Brass Company 76
Briggs-Detroiter Company 75
Broderick and Bascom Rope Company 71
Buda Company 62
Byrne, Kingston and Company 74

Chicago Automobile Supply House 82
Classified 83
Class Journal Co. 52b-52d
Clearing House 77 to 82
Connecticut Telephone and Electric Co. 60-61
Continental Motor Manufacturing Company 73
Corbin-Brown Speedometer 85
Corcoran Lamp Company 73
Cox Brass Manufacturing Company 70
Cullman Wheel Company 83

Dayton Rubber Manufacturing Company 72
Dodge Brothers 43
Dyneto Electric Company 75

Eisemann Magneto Company 70
Electric Auto-Lite Company 74

Firestone Tire and Rubber Company 75
Fisher Electrical Works 52a
Ford Motor Company 74
Fort Wayne Engineering & Manufacturing Co. 67

Gabriel Horn Manufacturing Company 63
Garford Manufacturing Company 65
General Motors Truck Company Cover
Gilbert Manufacturing Company 84
Goodrich, B. F., Company 72
Gray and Davis 4
Gould Storage Battery Company 65
Grossman, Emil, Manufacturing Company, Inc. 70

Haywood Tire and Equipment Company 62
Heinze Electric Company 71
Herz and Company 66
Holley Brothers Company 75
Houk, George W., Company 76
Hoyt Electrical Instrument Works 83
Hyatt Roller Bearing Company 72

Interstate Electric Company 69
Inter-State Motor Company 76

K-W Ignition Company 67
Kimball Tire Case Company 74
Kissel Motor Car Company 76

Lexington-Howard Company 56-57

Advertisements

Mandel Limousine Company.....	66
Master Carburetor Corporation.....	73
McQuay-Norris Manufacturing Company.....	69
Mercer Automobile Company.....	68
Metz Company.....	74
Morrison-Ricker Manufacturing Company.....	68
Motorists' Purchasing Association.....	69
Myers, W. M.....	76
National Motor Vehicle Company.....	64
New Departure Manufacturing Company.....	55
New York and New Jersey Lubricant Company	70
Nordyke and Marmon Company.....	83
Olds Motor Works.....	2
Packard Electric Company.....	50
Packard Motor Car Company.....	86
Paige-Detroit Motor Car Company.....	72
Pathfinder Company.....	52
Pennsylvania Rubber Company.....	70
Poyer, D. F., Company.....	63
Frest-O-Lite Company.....	76
Regal Motor Car Company.....	51
Republic Motor Truck Company.....	84
Republic Rubber Company.....	72
Robbins, Irvin, Company.....	67
Roper, C. F., and Company.....	83
Royal Equipment Company.....	1
Rutenber Motor Company.....	75
Salisbury Wheel and Manufacturing Co.....	74
Saxon Motor Company.....	53-54
Schrader's, A., Son, Incorporated.....	70
Scripps-Booth Company.....	46
Searchlight Company.....	72
Service Motor Supply Company.....	83
Shaler, C. A., Company.....	74
Shawver Company.....	70
Sheldon Axle and Spring Company.....	58-59
Sparks-Withington Company.....	70
Sphinx Motor Car Company.....	71
Splitdorf Electrical Company.....	71
Standard Oil Company.....	72
Star Ball Retainer Company.....	72
Stewart-Warner Speedometer Corporation.....	45
Stromberg Motor Devices Company.....	48-49
Superior Motor Specialty Company.....	82
Thermoid Rubber Company.....	75
Troy Wagon Works Company.....	66
Twitchell Gauge Company.....	66
Vulcan Car Company.....	73
Warner Gear Company.....	64
Western Electric Company.....	85
Weston Electrical Instrument Company.....	74
Wheeler and Schebler.....	44
Whitney Manufacturing Company.....	68
Willard Storage Battery Company.....	47
Willys-Overland Company.....	Back Cover
Winton Motor Car Company.....	73
Wisconsin Motor Manufacturing Company.....	76
Wykle, H. J.....	73
Zenith Carburetor Company.....	76



Which Speedometer Will You Select—?

The Speedometer that shows a variation of 28% between 0° and 100° Fahrenheit, or the speedometer that shows no appreciable variation under the same conditions?

There are many reasons why it is to your interests to select the

ORBIN-BROWN SPEEDOMETER

"The Speedometer of Absolute Accuracy"

But—the one reason, more important than any other, is the fact that the Corbin-Brown is built on the *centrifugal* principle.

For, if the accuracy of a speedometer is going to fluctuate with the weather, there is practically no value in having a speedometer at all.

Very few speedometers are permitted to operate under ideal climatic conditions. Practically all are subjected to extremes of heat and cold.

Tests conducted in government laboratories have proved that the magnetic speedometer shows a variation of 28% between 0° and 100° Fahrenheit and that the centrifugal speedometer is practically unaffected under the same conditions.

Is it not obvious that your future satisfaction demands the selection of a *centrifugal* Speedometer—the Corbin-Brown?

Write today for Catalog

THE CORBIN SCREW CORPORATION

THE AMERICAN HARDWARE CORPORATION, Successors

NEW BRITAIN, CONN.

BRANCHES: New York Chicago Philadelphia

Makers of Corbin Brakes and Automatic Screw Machine Parts

Everything for the Automobile, Motorcycle or Motor-boat Ignition is comprised in the reliable and up-to-date line of

Western Electric PITTSFIELD

IGNITION APPARATUS

The spark plugs include
Maximum Duty
Mica
Porcelain Mica
Porcelain
and special plugs

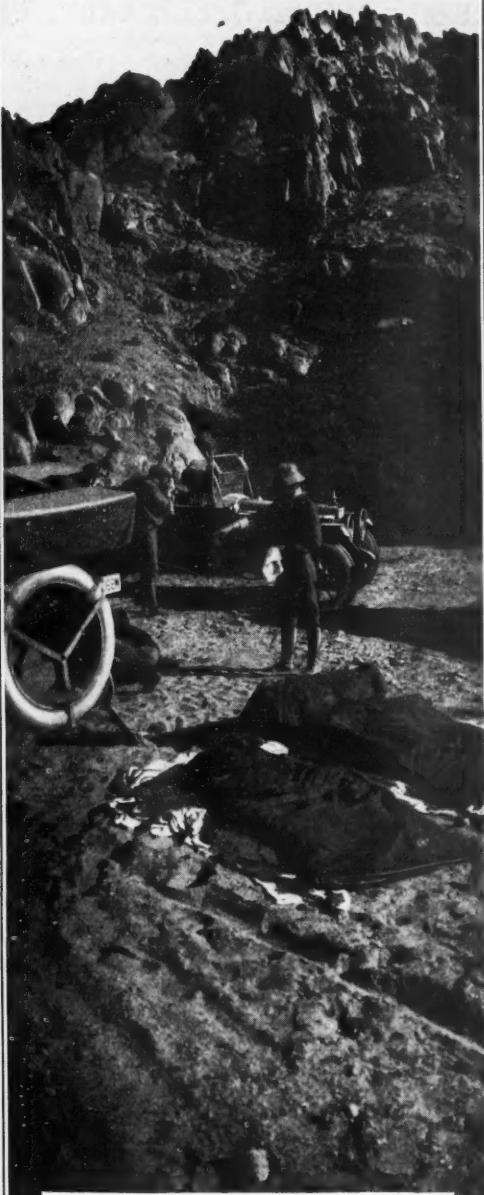
Get prices from our nearest house

Pittsfield Spark Coil Co., Mfrs.

WESTERN ELECTRIC COMPANY

Offices in all Principal Cities

The All-American Car



SAMPLE cars of each new model are built far in advance of regular production and driven thousands of miles over desert and mountain trails. This picture shows a test camp in the foothills of the San Jacintos.

AS PIONEERS we once accepted European standards under the natural assumption that, being older in practice, they represented a more mature development.

But while our foreign connections were making parts that were acceptable as separate units, Packard engineers were working constantly toward their ideal of a completed car with every part designed and built in perfect harmony with every other part.

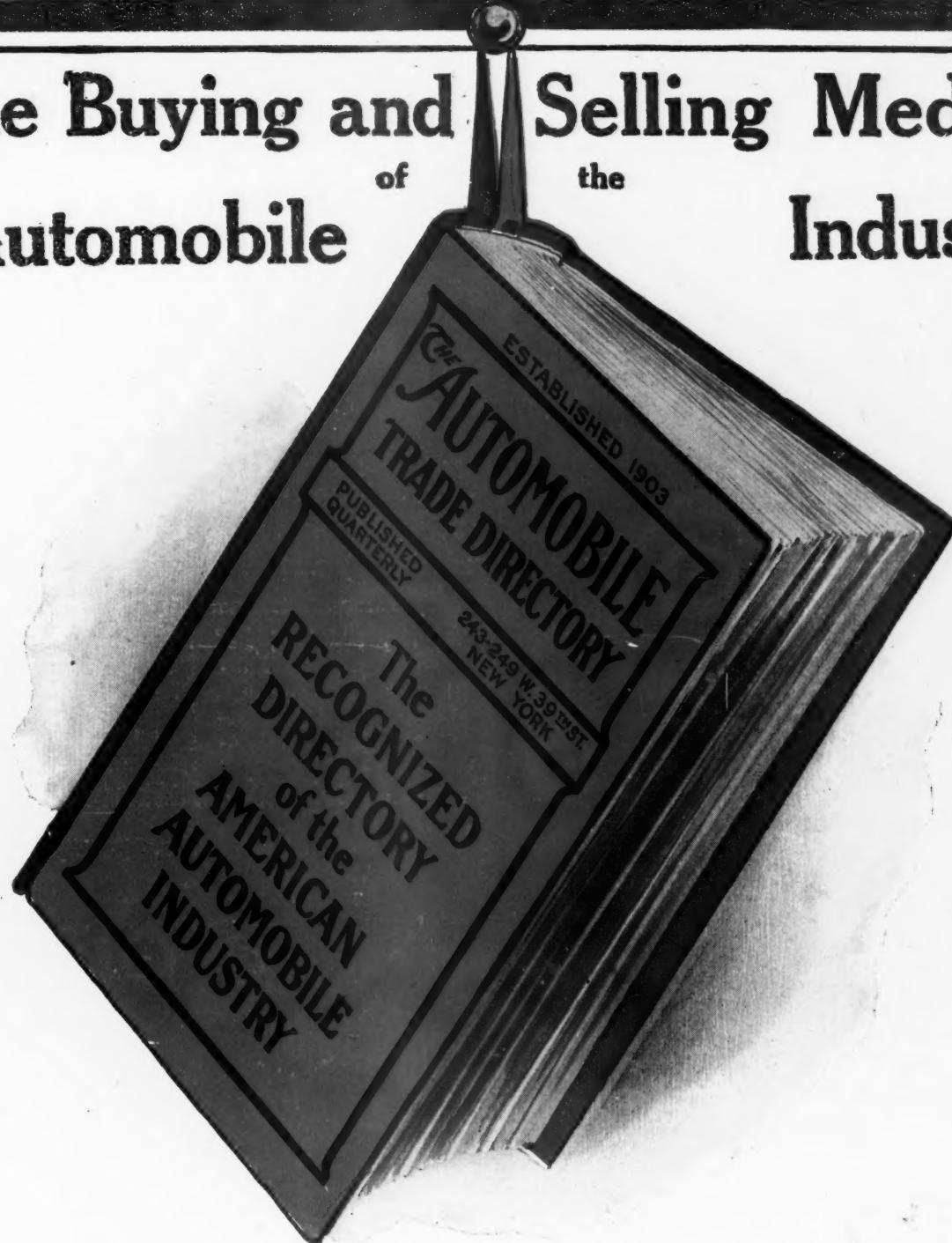
In the fixed purpose of attaining a Packard motor carriage standard which would surpass every previous achievement at home or abroad, we found the American answer for American requirements.

Results are valued in proportion to the intelligent and useful effort necessary to their accomplishment. Today the Packard is completely independent of Europe. It is Packard-made throughout and is rightfully acknowledged to be the criterion of motor cars.

*Ask
the man who
owns one*

PACKARD MOTOR CAR COMPANY
DETROIT • MICHIGAN

The Buying and Selling Medium of the Automobile Industry



Interested attention at the buying moment holds the balance of power in the field of selling.

The Automobile Trade Directory is the only medium that conserves the advertisers' best interests in this direction.

It is the economical advertising medium of the automobile trade and carries the advertising of more concerns than any other publication in its field.

THE AUTOMOBILE TRADE DIRECTORY

243-249 West 39th Street NEW YORK



1915

Overland

\$1075

MODEL 80 F.O.B. TOLEDO

THE only ordinary thing about the 1915 Overland is the price. In every other respect it is an extraordinary value.

BRIEF SPECIFICATIONS

Motor: 35 h. p.
Full stream-line body
Tonneau: longer and wider
Upholstery: deeper and softer
Windshield: rain-visation, ventilating type, built-in
Electric starter
Electric lights

All electric switches on steering column
High-tension magneto
Thermo-syphon cooling
Five bearing crank-shaft
Rear axle: floating type
Rear springs: extra long, and underslung
 $\frac{3}{4}$ elliptic
Wheel base: 114"

34"x4" tires
Demountable rims—one extra
Left-hand drive
Center control
Body: beautiful new Brewster green finish
Mohair top and boot
High-grade magnetic speedometer
Robe rail, foot rest and curtain box

Handsome 1915 catalog on request. Please address Dept. 46.

The Willys-Overland Company
TOLEDO, OHIO

Model 80 Prices:

5 Passenger Touring Car—\$1075
2 Passenger Roadster—\$1050
4 Passenger Coupe—\$1600

Model 81 Prices: Model 82 Prices:
5 Passenger Touring Car \$850 Overland Six \$1475
2 Passenger Roadster \$795

All prices f. o. b. Toledo, Ohio

